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SESQUITERPENE LACTONES OF SAGEBRUSH*: CONSTITUENTS OF *ARTEMISIA TRIPARTITA*

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Key Word Index—*Artemisia tripartita*; Compositae; sagebrush; sesquiterpene lactones; guaianolides; achillin; desacetylmatricarin; matricarin; artemecanin; canin; santanolide; ridentin-B; germacranolide; artevasin.

Sesquiterpene lactones of *Artemisia tripartita* Rydb. ssp. *tripartita* were investigated as a part of this laboratories program on chemical constituents of sagebrush in Montana.¹ Leaf samples of this subspecies collected from two different Montana locations gave different patterns on TLC. Sample A (collected near Dillon, Montana, T.8 S., R.11 W., Section 3) on extraction with CHCl₃ and chromatography gave matricarin,² desacetylmatricarin^{2,3} and an unidentified lactone.

Sample B (collected near Ovando, Montana, T.15 N., R.12 W., Section 27) on similar processing gave achillin,⁴ canin,⁵ ridentin-B^{2,6} and artevasin.⁷ It also contained some artemecanin⁵ that could not be isolated in pure form. These compounds were identified by their UV, IR and NMR spectra and by their m.p. and m.m.p. with authentic samples as shown in Table 1. The melting point of ridentin-B in this table is higher than the literature value. This is perhaps because in the previous studies this compound could not be isolated as a pure compound.

TABLE 1. PHYSICAL PROPERTIES OF *Artemisia tripartita* SSP.
tripartita SESQUITERPENE LACTONES

| Lactone | M.p. | M.m.p. | Ref. |
|----------------------|---------|---------|------|
| Matricarin | 192–193 | 192–194 | 2 |
| Desacetylmatricarin* | 154 | 154 | 3 |
| Achillin | 145–146 | 144–145 | 4 |
| Canin | 244–245 | 244–245 | 5 |
| Ridentin-B | 205–206 | — | 2,6 |
| Artevasin | 208–210 | 208–210 | 7 |

* Acetylation of desacetylmatricarin gave matricarin.

* Part IX in the series on "Chemical Composition of Sagebrush". For Part VIII see SHAFIZADEH, F. and BHADANE, N. R. (1973) *Tetrahedron Letters* **24**, 2171.

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Previous studies of *A. tripartita* ssp. *tripartita* collected in Wyoming² resulted in the isolation of desacetoxymatricarin and ridentin. These studies collectively show the presence of closely related but not necessarily identical sesquiterpene lactones in samples collected from different locations.

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TRITERPENES AND STEROL FROM THE ROOTS OF *ASTER SCABER*

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Key Word Index—*Aster scaber*; Compositae; friedelin; friedelan-3 β -ol (*epi*-friedelinol); squalene; α -spinasterol.

Plant. *Aster scaber* Thumb. (Compositae). *Source.* Hachioji, Tokyo, Japan. Voucher specimen is kept in the Herbarium of National Science Museum, Tokyo (TNS 314700). *Previous work.* On sister species, *A. tartaricus* (on flowers,¹ on roots²).

Present work. The residue obtained from the C₆H₆ extract of *A. scaber* roots was extracted with light petrol.-C₆H₆ (1:1). The solvents were evaporated to give a residue, which on repeated chromatographic separation followed by subsequent purification procedures afforded squalene,³ friedelin,⁴ friedelan-3 β -ol (*epi*-friedelinol)⁵ and α -spinasterol.⁶

EXPERIMENTAL

Dried roots (11 kg) of *A. scaber* were extracted with hot C₆H₆ and the solvent was evaporated to give a residue (117 g). This was extracted with light petrol.-C₆H₆ (1:1) and the residue (102 g) obtained after removal of the

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