

to the methyl ester obtained from *Espeletia tenore*.¹ Reduction of IV with LiAlH_4 affords an alcohol which also shows in the NMR spectrum an AB quartet at 3.56 δ . Hydrogenation of III and IV with PtO_2 as a catalyst renders the same product, m.p. 77–79°. The IR spectra of both hydrogenated compounds are identical.

The relative amounts of (–)-kaur-16-en-19-oic and (–)-kaur-15-en-19-oic acid in each of the three species was determined by GLC² (2% XE-60 on silanized Chromosorb W, 190°, He at 40 ml/min). The areas under the peaks were measured and showed 25%, 20% and 25% of I in *E. figureirasii*, *E. floccosa*, and *E. moritziana* respectively. *E. floccosa* exhibits the highest content of kaurenic acids (0.1%), *E. figureirasii* is also relatively rich (0.02%), but *E. moritziana* gave a very poor yield (0.001%). The life cycle of the plant could be responsible for this wide difference in kaurenic acids content, since *E. floccosa* was harvested at a budding stage while the other two were sterile when gathered.

¹ A. USUBILLAGA and A. MORALES, *Rev. Latinoam. Química* **1**, 128 (1970).

² A. USUBILLAGA and K. DE AROCHA, unpublished results.

Key Word Index—*Espeletia* spp.; Compositae; kaurenic acids.

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FLAVONOIDS OF *HELENIUM BREVIFOLIUM*

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Plant. *Helenium brevifolium* (Nutt.) A. Wood. *Source.* Collected by Dr. R. I. Godfrey, West of Tallahassee, Florida, Spring 1958. *Previous work.* Pseudoguaianolides from CHCl_3 extract.¹

Compounds isolated. After prior extraction with CHCl_3 , vitexin, orientin and small quantities of swertisin and saponaretin were isolated from the methanolic extract of the aerial portion of the plant by the methods described in an earlier paper² and identified by direct comparison with authentic materials by m.m.p., co-chromatography (TLC, 3 solvents) and IR analysis.

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² H. WAGNER, M. A. IYENGAR, E. MICHAELLES and W. HERZ, *Phytochem.* **10**, 2547 (1971).

Key Word Index—*Helenium brevifolium*; Compositae; vitexin; orientin; swertisin; saponaretin.