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VOLATILE CONSTITUENTS OF *LEPECHINIA CALYCINA*

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**Key Word Index**—*Lepechinia calycina*; Labiatae; monoterpenes;  $\delta$ -3-carene; essential oil.

In a previous report by one of us, the chemical composition of the essential oil of a native North American Labiatae, *Satureja douglasii*, was described [1]. In this note, we report the chemical composition of an essential oil of another native North American Labiatae, *Lepechinia calycina* Epl. Using techniques that have been described previously [2], the oil of *L. calycina* was found to contain 1,8-cineole (19.7%), camphor (17.5%),  $\delta$ -3-carene (17.4%), camphene (7.8%),  $\alpha$ -pinene (6.5%), caryophyllene (5.7%), linalool (2.6%),  $\alpha$ -terpinene (2.3%), limonene (2.3%),  $\beta$ -pinene (1.8%), *trans*-nerolidol (1.8%), myrcene (1.7%),  $\alpha$ -terpineol (1.5%),  $\gamma$ -terpinene (1.4%),  $\alpha$ -phellandrene (1.0%), terpinolene (0.9%), piperitone (0.8%),  $\delta$ -cadinene (0.8%), *p*-cymene (0.7%), terpinene-4-ol (0.7%),  $\alpha$ -phellandrene (0.6%), menthone (0.6%), phenylethyl butyrate (0.6%), *trans*- $\beta$ -farnesene (0.3%), 10-*epi*- $\alpha$ -cadinol (0.3%),  $\alpha$ -thujene (0.2%), isomenthone (0.2%),  $\alpha$ -gurjunene (0.2%),  $\alpha$ -humulene (0.2%), bornyl acetate (0.1%), geranyl acetate (0.1%) and trace amounts of neoisopulegol and phenylethyl 2-methyl butyrate.

From a comparative standpoint, the chemical composition of *L. calycina* is not dissimilar to that found in other North American Labiatae. For example, in 1967 Emboden and Lewis [3] showed that some 15 species of *Salvia* contained 1,8-cineole as one of the major components. In addition, with the exception of *Salvia columbariae*, *S. pachyphylla* and *S. brandegei*, all of the

other species were found to contain camphor as one of the other major components.

The occurrence of  $\delta$ -3-carene in the oil of *L. calycina* is somewhat unusual, as it was not found as a constituent of the aforementioned *Salvia* species. It is more normal to find  $\delta$ -3-carene as a constituent of the Pinaceae, not the Labiatae; its occurrence in *Lepechinia* may thus be of chemotaxonomic interest.

## EXPERIMENTAL

Plant material was obtained from University of California Botanical Gardens. A specimen of this plant has been placed in the herbarium at University of Waterloo. The essential oil used in the analysis was obtained using a modified Clevenger apparatus. All individual compounds were identified by careful comparison of their IR spectra with those of authentic markers. Percentage composition measurements were made with the aid of electronic integration of a flame detection from a capillary GLC run.

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