Notizen

Chemical Constituents from Hepaticae, XVIII

Low-boiling Constituents in the Essential Oil of the Liverwort, *Bazzania pompeana* (Lac.) [1]

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Liverwort (Hepaticae), β-Pinene, γ-Terpinene, 3-Octanone, Camphor, Thujanol

In the course of investigation on chemical constituents of essential oil of the liverwort, *Bazzania pompeana*, the low-boiling constituents were identified as β-pinene, γ-terpinene, 3-octanone, camphor and thujanol.

The liverworts (Hepaticae) form a unique group in the plant kingdom and contain characteristic several oil bodies in the cells. Chemical investigation on the essential oil of the liverworts has been undertaken at the first by Müller in 190 [2], but it has been afterwards interupted owing to the difffculty in collection of a large amount of the plants and to the dissatisfaction in the botanical homogeneity. In the present time, however, the study on the essential oils is placed in active progress by our and other some groups.

The present paper deals with the analysis of low-boiling constituents in the essential oil for *Bazzania pompeana* (Lac.) Mitt. which is a leafy liverwort belonging to the Lepidoziaceae, in connecting with previous papers on a high-boiling constituents, that is sesquiterpenoids, in this essential oil [3–7].

Table. Low-boiling constituents of the essential oil of *Bazzania pompeana*.

Compound	Relative content [%]*	Molecular ion	Base ion
β-pinene	6.5	*m/e* 136	*m/e* 93
γ-terpinene	5.4	136	93
3-octanone	71.5	128	99
camphor	2.5	152	95
thujanol	4.7	154	93

* Relative content was calculated on relative peak areas in the gas chromatogram of the low-boiling fraction.

The essential oil obtained by steam distillation of the plant was fractionated to separate a low-boiling fraction, which exhibited five peak on gas chromatogram. These constituents were identified as β-pipene, γ-terpinene, 3-octanone, camphor and thujanol by measuring mass spectra with GC-MS and gas chromatographic comparison with authentic samples. The relative contents of these components were as listed in Table.

This is the first instance in which these low-boiling constituents were detected in liverworts.

Experimental

Essential oil of the liverwort

The liverwort, *B. pompeana*, was collected at mountains within easy reach of Hiroshima Prefecture in June 1971, and the whole plant was distilled with steam to obtain an essential oil. The aqueous distillate was also extracted with ethyl ether and the extract, after evaporation of the solvent, was added to the essential oil. The essential oil thus obtained, $\alpha_D^{25} +34.7°$, n_D^{25} 1.5073, d_4^{25} 0.9397, was fractionated through a spinning distillation column at reduced pressure of 30 mm Hg to give a low-boiling fraction distilled at 70 – 90 °C in a yield of about 3% to the essential oil, whose constituents were examined.

Identification of β-pinene, γ-terpinene, 3-octanone, camphor and thujanol

The analysis of the fraction was carried out by using a combined apparatus of a mass spectrometer and a gas chromatograph in connection with a separation column packed with 3% Silicon SE-30 on Diasolid L. β-Pinene [8], γ-terpinene [8], 3-octanone [9], camphor [10] and thujanol [11] were identified on the basis of agreement of the mass spectra with authentic ones. The identity of these compounds was further confirmed in admixing with authentic samples on gas chromatography with two separation columns of 3% SE-30 on Diasolid L and 3% PEG 6000 on Diasolid L.

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