



TRANS-METHYL CINNAMATE: THE MAJOR VOLATILE FROM SOME POPULATIONS OF THE LIVERWORT, *CONOCEPHALUM CONICUM*

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Key Word Index—*Conocephalum conicum*; Hepaticophyta; *trans*-methyl cinnamate.

Abstract—*trans*-Methyl cinnamate was identified as the major volatile component from two populations of *Conocephalum conicum*, but was not detected in other populations.

INTRODUCTION

Natural products from the liverwort, *Conocephalum conicum* (L.) Dumort., have been the subject of numerous investigations [1-19]. We studied the volatile components from a sample of this liverwort of unknown natural origin, which grows in the greenhouse at Humboldt State University. The major volatile component from this population was *trans*-methyl cinnamate [methyl (*E*)-3-phenyl-2-propenoate], a compound previously not reported from this or any other liverwort species [20]. Surprisingly, this compound could not be detected in extracts of wild *C. conicum* from local, coastal northern California. However, it was the major volatile component in a population from southern Illinois.

RESULTS AND DISCUSSION

Gas chromatography-mass spectral (GC-MS) analysis of dichloromethane extracts of *C. conicum* from the Humboldt State University greenhouse showed only three volatile components with an abundance of over 1%. The major component (83%) had a molecular ion at $m/z = 162$ ($C_{10}H_{10}O_2$). A major fragment at $m/z = 131$ indicates loss of a methoxyl group ($-OCH_3$), followed by loss of carbon monoxide (CO) to give a fragment at $m/z = 103$ and finally a loss of a disubstituted ethenyl group ($-CH=CH-$) to give a fragment for a monosubstituted benzene at $m/z = 77$. A candidate compound, *trans*-methyl cinnamate, had identical properties by GC-MS analysis. Wild *C. conicum* from local coastal areas of northern California had 15 volatile components of over 1% abundance; however, no methyl cinnamate was detected. Similar GC-MS analysis of *C. conicum* from southern Illinois had 12 volatile

cinnamate. This compound has such a distinct, pleasant odour (matsutake mushroom) that it certainly would not have been overlooked by all previous investigators.

Variations in natural products and enzymes have previously been observed for *C. conicum*. Differences in flavonoid content have been used to show that there are geographic races of *C. conicum* [3, 10]. Analysis of phenolic compounds from 20 different Polish populations of this liverwort showed differences between two Polish races of this plant [21]. Also, variations of enzymes have been used to distinguish populations of *C. conidum* [22]. Thus, with a record of changing chemical and enzymic content, it is not too surprising to find *trans*-methyl cinnamate from some populations of this liverwort, but not in others. The presence or absence of methyl cinnamate may be useful for future population studies of this species.

EXPERIMENTAL

MS: Hewlett Packard MSD-5970, Automated GC-MS.

Plant material. *C. conicum* of unknown natural origin was obtained from the Humboldt State University greenhouse. Wild *C. conicum* was collected from the coastal section of Humboldt County, California, and Williamson County, Illinois. Vouchers of the greenhouse and Illinois populations have been deposited in ABSH: Humboldt #4957; Stotler #3464.

Extraction and analysis. A 2.0 g sample of each collection was crushed and then extracted for 1/2 h with 5.0 ml CH_2Cl_2 . A sample of the extract was concd from 1.0 to 0.1 ml with a stream of dry N_2 and then analysed by GC-MS.

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