

Essential Oils of Plants from Hispaniola: 3. The Leaf Oil of *Canella winterana* (Canellaceae).

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ABSTRACT: The essential oil from the leaves of *Canella winterana* (L.) Gaertn. from the Dominican Republic was analyzed and found to contain a large amount of myrcene (66.41%), with lesser amounts of caryophyllene (7.12), cis-ocimene (4.92), trans-ocimene (4.11), and 1,8-cineole (3.76). Yield (fresh wt. basis) was 0.42%. No eugenol was found in the leaf oil in contrast to its occurrence in the trunk bark.

KEY WORD INDEX: Canellaceae, *Canella winterana*, essential oil, terpenes.

INTRODUCTION: *Canella winterana* is known as canela in the Dominican Republic and as cannelle poivree in Haiti. It occurs as a native tree in the woodlands of the calcareous coastal regions of the island of Hispaniola (the Dominican Republic and Haiti), Jamaica, Puerto Rico in the Greater Antilles, Bahama Islands and on the Lesser Antilles south to Barbados. The common names on English speaking islands often include: "cinnamon" in usage (e.g. wild cinnamon, cinnamon bark, pepper cinnamon) because of the aromatic bark. This common usage should not be confused with the true cinnamon bark from *Cinnamomum* spp. in the *Lauraceae*.

Ayensu (1) reports the use of the leaves and bark as folk medicinals and also as fish poison. In the Bahamas, the bark is used to relieve headaches (2). The leaves are reported to be used as a spice in the Virgin Islands (3).

The essential oil of the leaves has not been thoroughly analyzed as Gibbs (4) merely notes that the leaf oil contains largely myrcene. However, the bark of *Canella winterana* is used for flavoring because of its spicy flavor due to eugenol and 1,8-cineole (5). The trunk bark is also the source of the antifungal and antimicrobial sesquiterpene, canellal (6,7) and 3-methoxy-4,5-methylene-dioxy-cinnamaldehyde (6). More recently myristicin, warburganal, 9 α -hydroxy-cinnamolide and mukaadial have been reported from the bark (8).

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The purpose of this paper is to present the composition of the leaf essential oil of *Canella winterana* as a part of a series on the volatile oils of plants of Hispaniola.

EXPERIMENTAL: Fresh foliage of *C. winterana* was collected from native trees in the Dominican Republic and a voucher specimen (Zanoni 38468) is deposited in the herbarium at Jardín Botánico Nacional, Santo Domingo (JBSD). The leaves were steam distilled in a modified Clevenger apparatus (9) and the oil collected after it accumulated in the side arm. Distillations were performed for 2 h. The oils were sealed in glass vials with teflon lined caps and air mailed to RPA where the samples were stored at -20°C until analyzed.

Mass spectra were recorded with a Finnigan Ion Trap mass spectrometer (ITMS), model 800, directly coupled to a Varian 6500 gas chromatograph, using a J & W DB5, 0.26 mm id x 30 m, 0.25 micron coating thickness, fused silica capillary column. The GC/ITD was operated under the following conditions: injector temperature: 220°C ; transfer line: 240°C ; oven temperature programmed: $60^{\circ}\text{C} - 240^{\circ}\text{C}$ @ $3^{\circ}\text{C}/\text{min}$; carrier gas: He @ 31.9 cm/sec or 1.017 ml/min (@ 210°C); injection: 0.1 μl (10% soln.), split 1:20, 500 ng/on column. Tuning values for the ITD were 100, 100, 100, 100 using cedrol as a tuning standard. Internal standards (n-octane and n-eicosane) were added to each sample to aid in the standardization of retention times. Identifications were made by library searches of our volatile oil library (10), LIBR(TP) using the Finnigan library search routines based on fit and standardized retention times (10,11).

RESULTS AND DISCUSSION: The fresh leaves of *Canella winterana* yielded 0.42 g of oil/100 g (0.42%). The composition of the leaf essential oil of *Canella winterana* is reported in Table I. The oil is dominated by myrcene (66.41%),

Table I. The volatile oil composition of fresh *Canella winterana* leaves from the Dominican Republic.

Compound*	% total oil	Compound	% total oil
2-hexanal	t	terpinen-4-ol	0.21
α -thujene	t	α -terpineol	0.12
α -pinene	0.17	phenyl ethyl acetate	t
sabinene	0.43	α -terpinyl acetate	0.79
β -pinene	0.27	RT1335	0.56
myrcene	66.41	β -elemene	0.20
α -terpinene	t	methyl eugenol	t
p-cymene	t	caryophyllene	7.12
limonene	0.12	α -Humulene	0.45
1,8-cineole	3.76	<i>cis</i> - β -farnesene	0.51
<i>cis</i> -ocimene	4.92	<i>trans</i> -isoeugenol	0.10
<i>trans</i> -ocimene	4.11	<i>cis</i> -nerolidol	t
γ -terpinene	t	<i>trans</i> -nerolidol	1.50
2,5-dimethyl styrene	t	caryophyllene oxide	1.87
linalool	0.46	RT2242	0.98
β -pinene oxide	t	RT2537	0.77

*Listed in order of their elution from a DB5 (= SE54) column. Unidentified compounds with values less than 0.5% of the total oil not listed. t = less than 0.1% total oil.

confirming the earlier report of Gibbs (4). Only 6 other components were present in amounts greater than 1%: caryophyllene (7.12), cis-ocimene (4.92), trans-ocimene (4.11), 1,8-cineole (3.76), caryophyllene oxide (1.87) and transnerolidol (1.50). Single ion searches for 248 (M^+) and 230 ($M^+ - H_2O$) failed to detect canellal in the leaf volatile oil. Not even a trace of eugenol was found in the essential oil from the leaves of *Canella winterana* in contrast to occurrence of eugenol in the trunk bark (4,5).

There were three unidentified compounds (larger than 0.5% total oil). RT1335, ITMS, m/z (rel. int.): 196[M^+ ?], 43(100), 53(7), 67(9), 79(9), 91(20), 105(7), 119(19), 134(10), terpene acetate. RT2242, ITMS, m/z (rel. int.): 222[M^+] (3), 109(100), 41(40), 55(20), 69(18), 79(14), 91(21), 124(16), 135(6), 147(2), 191(7), 204(2), sesquiterpenoid alcohol. RT2537, ITMS, m/z (rel. int.): 232 [M^+] or [$M^+ - H_2O$] (13), 91(100), 41(69), 51(41), 67(37), 77(58), 105(80), 119(38), 131(33), 147(36), 159(15), 171(25), 189(16), 199(25), 214(20), possibly canellal with one hydrated aldehyde group, if so, then the MW must be 250.

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