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Composition of the essential oils from the leaves of *Microglossa pyrifolia* (Lam.) O. Kuntze and *Helichrysum odoratissimum* (L.) Less. growing in Cameroon

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ABSTRACT: Four essential oil samples obtained by hydrodistillation from the leaves of *Microglossa pyrifolia* (Lam.) O. Kuntze and *Helichrysum odoratissimum* (L.) Less., respectively, were analysed by GC and GC–MS. The main constituents of the leaf oil of *M. pyrifolia* were found to be (*E*)-β-farnesene (78% and 73%) and β-caryophyllene (11% and 14%), whereas those of *H. odoratissimum* were α-Pinene (47% and 41%), β-caryophyllene (14% and 5%) and α-curcumene (4% and 20%). Copyright © 1999 John Wiley & Sons, Ltd.

KEY WORDS: *Microglossa pyrifolia* (Lam.) O. Kuntze; *Helichrysum odoratissimum* (L.) Less.; Asteraceae; essential oil; (*E*)-β-farnesene; α-pinene; β-caryophyllene; α-curcumene

Introduction

Microglossa pyrifolia (Lam.) O. Kuntze is an erect or straggling shrub belonging to the Asteraceae family. This species is also known as *M. volubilis* DC., or *Conyza heudelotii* Oliv. & Hiern.[1,2] Its leaves and stems are more or less pubescent, whereas the florets are pale or white in numerous small heads. *M. pyrifolia* is used in Cameroon for the treatment of headache and stomach pain.[3]

Helichrysum odoratissimum (L.) Less. is also a member of the Asteraceae; it is described by some authors as *Gnaphalium odoratissimum* L. or *Achyrocline hochsteheri* Sch. Bip. ex. A. Rich.[1] It is a perennial herb with slender white-woolly erect or straggling winged branches, 1–5 ft high; flowerheads are pale golden-yellow, very small and numerous, in terminal corymbs. The juice from the leaves of this plant is used to accelerate the healing of wounds.[3]

Previous studies of other *Helichrysum* species reported the identification of both monoterpenes and sesquiterpenes in their essential oils.[4–8] To the best of knowledge, no report is available on the essential oils of *M. pyrifolia* and *H. odoratissimum*. We present in this paper the analysis of the essential oils obtained by hydrodistillation from the leaves of these two Asteraceae collected in the West region of Cameroon.

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Experimental

Plant Material and Isolation Procedure

Flowering *Helichrysum odoratissimum* plants were collected in Bafoussam in August 1991 (sample B_1) and in September 1991 (sample B_2) and flowering *Microglossa pyrifolia* plants were collected in Bandjoun and in Dschang in March 1995 (samples A_1 and A_2). The plant identifications were performed by the National Herbarium in Yaoundé, where voucher specimens (Numbers HNC 1640 and HNC 1283) were deposited.

Fresh leaves of both *M. pyrifolia* and *H. odoratissimum* were submitted to hydrodistillation in fractions of 500 g for 8 h using a Clevenger-type apparatus, as described in the French *Pharmacopoeia*.[9] The essential oils obtained were dried over anhydrous sodium sulphate and then submitted to GC and GC–MS analysis.

Identification of Oil Components

GC analyses were performed on two fused-silica columns (25 m × 0.32 mm i.d.) coated with OV-101 or Carbowax 20 M. The oven temperature was programmed from 50°C to 200°C at a rate of 5°C/min.

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Table 1. Percentage composition of essential oil samples isolated from the leaves of *Microglossa pyrifolia* (Lam.) O. Kuntze from Cameroon

Compounds	KI[b]	Sample A_1	Sample A_2
Monoterpene hydrocarbons			
α-Pinene	934	t	1.0
Sabinene	968	t	t
β-Pinene	974	t	0.1
Myrcene	981	t	t
Limonene	1024	t	t
(*Z*)-β-Ocimene	1028	t	t
(*E*)-β-Ocimene	1039	1.4	2.0
γ-Terpinene	1045	t	–
Terpinolene	1082	t	–
Total		1.4	3.1
Oxygenated monoterpenes			
Linalol	1084	1.4	1.0
Terpinen-4-ol	1170	t	–
α-Terpineol	1176	t	t
Total		1.4	1.0
Sesquiterpene hydrocarbons			
β-Caryophyllene	1429	11.4	14.0
(*E*)-β-*Farnesene*	1448	78.3	72.5
α-Humulene	1461	1.4	1.5
Germacrene-D	1487	4.6	5.0
Bisabolene[a]	1500	1.0	2.5
Farnesene[a]	1500	t	t
γ-Cadinene	1506	t	t
δ-Cadinene	1518	t	t
Total		96.7	95.5
Oxygenated sesquiterpenes			
Nerolidol	1553	t	t
Caryophyllene epoxide	1576	t	–

[a] Correct isomer not characterized.
[b] Kováts indices on OV-101 column.
t = trace (<0.05%).

Table 2. Percentage composition of essential oil samples isolated from the leaves of *Helichrysum odoratissimum* (L.) Less. from Cameroon

Compounds	KI[b]	Sample B_1	Sample B_2
Monoterpene hydrocarbons			
α-*Pinene*	934	47.1	40.6
Sabinene	968	0.9	0.3
β-Pinene	974	0.1	0.6
Myrcene	981	t	0.3
Limonene	1024	–	t
(*Z*)-β-Ocimene	1028	2.7	1.1
(*E*)-β-Ocimene	1039	t	0.3
γ-Terpinene	1045	–	0.4
Terpinolene	1082	t	t
Total		50.8	43.6
Oxygenated monoterpenes			
Linalol	1084	t	0.5
Terpinen-4-ol	1170	t	t
α-Terpineol	1176	t	0.7
Total			1.2
Sesquiterpene hydrocarbons			
α-Ylangene	1379	t	t
α-Copaene	1384	1.2	1.4
Santalene	1405	0.6	0.9
β-*Caryophyllene*	1429	13.8	5.1
(*E*)-β-Farnesene	1448	2.1	0.4
α-Humulene	1461	4.9	3.0
Germacrene-D	1487	2.6	5.1
α-*Curcumene*	1475	4.3	20.3
Farnesene[a]	1491	1.1	1.1
Valencene	1495	2.3	2.8
ε-Cadinene	1498	t	t
β-Bisabolene	1500	2.0	0.4
γ-Cadinene	1506	3.9	3.2
δ-Cadinene	1518	5.1	5.8
Cadina-1,4-diene	1528	t	0.6
α-Cadinene	1532	0.9	0.7
Total		44.8	50.8
Oxygenated sesquiterpenes			
Caryophyllene epoxide	1576	0.7	0.1
Humulene epoxide	1602	t	0.3
δ-Cadinol	1618	t	t
T-cadinol	1625	1.8	1.7
α-Cadinol	1627	1.0	0.7
Total		3.5	2.8

[a] Correct isomer not characterized.
[b] Kováts indices on OV-101 column.
t = trace (<0.05%).

GC–MS analyses were carried out on a Hewlett-Packard GC-quadrupole MS system (Model 5970) fitted with a 25 m × 0.32 mm i.d. fused-silica column coated with DB-1, using the same gas chromatographic parameters, and on a Perkin-Elmer GC–MS system (Sigma 3B/VG 7070 P) fitted with a CP-Wax 51 column, 50 m × 0.2 mm i.d., using a temperature programme (50°C for 5 min, then 50°C to 222°C at 2°C/min). For component identification, authentic reference compounds as well as published mass spectra and retention indices were used.[10–12]

Results and Discussion

The essential oils were obtained in 0.3% and 0.12% (v/w) average yields for *M. pyrifolia* and *H. odoratissimum*, respectively. The results of the GC and GC–MS analyses are given in Tables 1 and 2, where the oil components are listed according to their chemical classes. The leaf essential oil of *M. pyrifolia* contained mainly sesquiterpene hydrocarbons (96.7% and 95.5%) with (*E*)-β-farnesene (78.3% and 72.5%) as main component. There were no significant differences between the sample from Dschang (sample A_2) and that from Bandjoun (sample A_1).

The essential oil of *H. odoratissimum* was characterized by practically the same amounts of monoterpene hydrocarbons (50.8% and 43.6%) and sesquiterpene hydrocarbons (44.8% and 50.8%). α-Pinene was the major component of both samples B_1 and B_2. The amount of β-caryophyllene in sample B_1 (13.8%) was higher than that in sample B_2 (5.1%), while the percentage of α-curcumene in sample B_1 (4.3%) was lower than that in sample B_2 (20.3%). These main differences may be due to the different periods in which plants were collected. These essential oil samples did not contain unusual constituents, as was found to be the case for *H. angustifolium*[5] and *H. italicum*.[7] Thus,

the composition of *H. odoratissimum* oil can be considered classical, as was the case for *H. bracteiferum*,[4,6] since it contained only monoterpenes and sesquiterpenes commonly found in essential oils.

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