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Drimenin-rich essential oils from *Hertia cherifolia* growing in Algeria

A. Zellagui [a], N. Gherraf [a] and M. Lahouel[b]

[a] *Laboratory of Biomolecules and Plant Breeding, Life Science and Nature Department ,Faculty of Exact Science and Life Science and Nature , University of Larbi Ben Mhidi Oum El Bouaghi ,Algeria.*

[b] *Laboratory of Pharmacology and phytochemistry, Department of natural and life science, Faculty of Science, University Jijel, Algeria.*

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Abstract

The hydrodistilled oil from crushed dry leaves of Hertia cherifolia which is endemic to Algeria and Tunisia collected from Ain Fekroun (Oum el Bouaghi, Algeria) were analyzed by gas chromatography-mass spectrometry to afford 36 components accounting for 99.3% of the total oil. the major components were found to be: Drimenin (67.5%), 1,2-Di(2-pyridinyl)-1,2-ethanediol (11.2 %), globulol(1.7 %), Cycloheptane, 4-methylene-1-methyl-2-(2-methyl-1-propen-1-yl)-1-vinyl- (1.5 %).

Key words *Hertia cherifolia, Essential oil, GC-MS, Drimenin*

1. Introduction

Essential oils have a complex composition, containing from a dozen to several hundred components. The great majority of components identified in essential oils includes terpenes (oxygenated or not), with monoterpenes and sesquiterpenes prevailing. Nevertheless, allyl- and propenylphenols (phenylpropanoids) are also important components of some essential oils [1], they can be synthesized by all plant organs (flowers, buds, seeds, leaves, twigs, bark, herbs, wood, fruits and root) and therefore extracted from these parts. The proportions of the components present in essential oils vary greatly. Major components can constitute up to 85% of the essential oils, while the remaining components can be present in only trace amounts [2]. Essential oils have many applications in folk medicine and for flavoring and preservation, as well as in the fragrance and pharmaceutical industries[2,3]. There has been a considerable interest in extracts and essential oils (EOs) from common culinary herbs, spices and aromatic plants, the Council of Europe describes "essential oil" as a product obtained from "vegetable raw material" [4]. Among many others, well-known families rich in essential oilsbearing species are asteraceae. Algeria is regarded as an important gene-centre for the family Asteraceae, it is an important sources of bioactive compounds and volatile oils, Genus *Hertia* comprises one species named *H.cherifolia* [5]. The aims of this study were to identify the chemical composition of essential oils isolated by hydro distillation the leaves of *H.cherifolia* grown in Algeria by gas chromatography/mass spectrometry (GC/MS) analysis.

2. Results and discussions

Table 1: Chemical composition of *H.cherifolia* essential oil

Constituents	Rt	%
6- α -Elemene	11.26	0.6
β -Caryophyllene	12.06	0.9
Humulene	12.97	0.4
Nopol	13.40	0.2
Eremophilene	13.58	0.7
α -Eudesmene	13.73	1.0
Valencene	13.80	0.7
α-Selinene	13.96	0.5
α-Murolene	14.11	0.1
Butylated Hydroxytoluene	14.21	1.0
α-Cubebene	14.34	0.3
Cadinene	14.57	0.8
Spathulenol	15.35	1.1
Cycloheptane, 4-methylene-1-methyl-2-(2-methyl-1-propen-1-yl)-1-vinyl-	15.43	1.5
Davanone	15.72	0.9
5-Pentadecen-7-yne, (Z)-	15.85	0.3
Propane, 1-chloro-3-diethylboryloxy-2,2-dimethyl	15.97	0.4

(Z,E)-α-Farnesene	16.43	0.5
Aromadendrene, dehydro-	16.84	0.2
1,10-Dimethyl-2-methylene-trans-decalin	16.97	0.7
Cycloisolongifolene	17.11	0.1
Benzene 1,1-diethylpropyl	17.34	3.4
(2S,4R)-p-Mentha-[1(7),8]-diene 2-hydroperoxide	17.40	0.1
2,2,4-Trimethylchromene-3	17.57	0.1
Bicyclo2.2.2.octane1,2,3,6-tetramethyl	17.70	0.3
Cyclopentanecarboxaldehyde, 2-methyl-3-methylene-	17.79	0.2
Tricyclo[4.4.0.0(2,7)]dec-3-ene-3-methanol, 1-methyl-8-(1-methylethyl)-	17. 95	0.1
1-(1-Ethyl-2,3-dimethyl-cyclopent-2-enyl)-ethanone	18.02	0.1
1,2-Ethanediol, 1,2-di-2-pyridinyl-	18.46	**11.2**
Drimenin	18.51	**67.5**
1-(6-Methyl-2-pyrazinyl)-3-methyl-1-butanol	18.65	0.3
Ethyl phthalyl ethyl glycolate	19.08	0.1
Decane-1-sulfonic acid (4-methoxy-phenyl)-amide	19.75	0.1
Cycloisolongifolene, 8,9-dehydro-9-formyl	21.06	1.1
Benzo[g]pteridine, 2,4-diamino-6,7,8,9-tetrahydro-7-methyl-	21.45	0.1
globulol	23.57	**1.7**
Total identified		99. 3%

Sesquiterpene hydrocarbons	**8.3**
Oxygenated monoterpenes	**0.3**
Oxygenated sesquiterpenes	**72.3**
others	**18.4**

The essential oils components identified are listed in Table 1, together with their relative percentages, in order of their retention times. The qualitative composition of the leaves yields thirty six components representing 99.3%. This report is the first study of the composition of the essential oils obtained from the leaves in vegetative stage of *H.cherifolia* growing in Algeria.

The essential oils(yield 0.02%, w/w) was mainly composed of with Drimenin (**67.5** %) as the major constituent, this is specific only in this species.

The main constituent of the essential oilsfrom the leaves was Drimenin (67.5%), 1,2-Di(2-pyridinyl)-1,2-ethanediol (11.2 %), globulol(1.7 %), Cycloheptane, 4-methylene-1-methyl-2-(2-methyl-1-propen-1-yl)-1-vinyl- (1.5 %).

Concerning the chemical composition of the essential oilsof other *Hertia* species, Afsharypuor *et al.* [6] showed that the oil of the aerial parts of Hertia angustifolia composed of the b-pinene (51.5%), b-phellandrene (16.5%), a-pinene (13.9%) and a-thujene (2.7%), as the main constituents. Also reported that the of the aerial parts of Hertia cheirifolia collected in aures – Algeria was characterized by contents Eremophilenolide-Type Sesquiterpenes isolated from chloroform and methanolic extract [7,8,9,10].

Hence, the composition of the essential oilsof the leaves of *H.cheirifolia* was very different from that of all the *Hertia* species studied so far. The compound that mostly characterized this species was (-)-Drimenin.

3. Experimental

3.1. Plant material and isolation

The leaves of *H.cherifolia* were collected during February 2010 (vegetative stage) in Oum el bouaghi, Algeria. The plants were identified by Dr Zellagui Amar and a voucher specimen was deposited in the Laboratory of Biomolecules and Plant Breeding, University of Larbi Ben Mhidi Oum under number ZA 122.

Fresh leaves (100g) were hydrodistilled in a Clevenger-type apparatus for 3 h.

3.2. Gas chromatography- mass spectrometry

Analyses were performed with a Varian CP-3800 gas chromatograph equipped with a DB-5 capillary column (30m × 0.25 mm; coating thickness 0.25 μm) and a Varian Saturn 2000 ion trap mass detector. Analytical conditions: injector and transfer line temperatures 220 and 240°C, respectively; oven temperature programmed from 60°C to 240°C at 3°C/min; carrier gas helium at 1 mL/min; injection 0.2 μL (10% *n*-hexane solution); split ratio 1:30. Identification of the constituents was based on comparison of the retention times with those of authentic samples, comparing their linear retention indices relative to the series of *n*-hydrocarbons, and by computer matching against commercial (NIST 98 and ADAMS) and homemade library mass spectra built up from

pure substances and components of known oils and MS literature data [11].

4. Conclusion

H.cheirifolia investigated for the first time in Algeria for essential oil. The analysis of the essential oils revealed that this essential oilsis rich in Drimenin because of the high content, this essential oilsmay become a source of this substance.

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