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Volatile Constituents in Aerial Part of *Kelussia odoratissima* from West of Iran

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ABSTRACT

In this study, essential oils from different organs of *Kelussia odoratissima* were obtained by hydro-distillation. Quality and quantity of chemical composition of essential oils were determined by capillary gas chromatography and using gas chromatoghraphy and mass spectrometric detection. The numbers of compounds were identified in the essential oil aerial parts were 37. Also, 1,8-cineol was the main component found in essential oils from aerial parts (27.95%) of *Kelussia odoratissima* in flowering stage. In addition chemical analysis of essential oils obtained from leaves and stem of *Kelussia odoratissima* were rich in oxygenated monoterepens were the main class of compounds in the essential oils from aerial parts of Kelussia odoratissima. Results of this study showed that the essential oils from aerial parts of Kelussia odoratissimahave a potential to be used as 1,8-cineol a new source in drug and food industries.

Key words: *Kelussia odoratissima*, Essential Oil, 1,8-cineol.

INTRODUCTION

There is at present increasing interest in the dusty and in scientific research for the essential oils and various extracts of plants as sources of natural products[1]. Herbs have been used for a large range of purpose including medicine, nutrition, flavoring, beverages, dyeing, repellents, fragrances, cosmetics, charms, smoking and industrial uses. the importance of antioxidants in the maintenance of health and in protection from the damage induced by oxidative stress (implicated in the risk of chronic diseases), is coming to the forefront of dietary recommendations, the development of functional foods and the extraction of novel potentially therapeutic compounds from medicinal plants. *Kelussia odoratissima* Mozaff. is a sweet-smelling, self-growing plant which is traditionally consumed in Iran as a garnish. Little**.** *Kelussia odoratissima* Mozaff., locally called "Karafskoohi in Iran, is commonly used in some parts of Iran as a popular garnish. It is also used as a folk medicine to treat hypertension, inflammation, ulcer, and cardiovascular diseases. The United Nations Developing Programme (UNDP) has recently announced *Kelussia* as an endangered plant and

therefore, investigations aimed at promoting its regular cultivation receive financial support from relevant bodies. The aim of this study was to determine the potential ability of *K. odoratissima* to postpone oxidation in model systems (*in vitro*) and in accelerated oxidation systems using sunflower oil[2].

Plant material

Kelussia odoratissima leaves were collected from Zagrous maintain in May 2010 and dried at 25–30 °C for 3 days without applying any heat treatment to minimize the loss of active components.

Table 1: Composition of the essential oil of *Kelussia odoratissima*

No.	Compounds	RT	RI	Area (%)
1	α-Pinene	65.3	939	99.16
2	Camphene	86.3	954	87.5
3	2-β-Pinene	19.4	979	74.0
4	β-myrcene	28.4	991	21.3
5	1-phellandrene	50.4	1003	40.3
6	Δ.3-carene	59.4	1031	17.1
7	Benzene	75.4	1112	30.1
8	DL-Limonene	81.4	1029	26.1
9	1,8-cineole	86.4	1031	95.27
10	1,3,6-octatriene	99.4	915	68.5
11	1,3-cyclohexanediol	08.5	927	49.1
12	Cis-5-methyl-5-vinyl	31.5	958	26.1
13	1-methyl-2-amino methylimidazole	34.5	963	56.
14	Linalool	63.5	1097	88.0
15	Cis-sabinenehyldrate	69.5	1070	69.0
16	(1H)-3a,4,5,6,7,7a-Hexahydroindene	76.5	1012	86.0
17	2-cyclohexen	97.5	1030	46.1
18	Chrysanthenone	01.6	1128	41.2
19	1-cyclohexene	21.6	1051	76.0
20	1-β.4,4-trimethyl-bicyclo	25.6	1054	12.1
21	Heptan [2,2,1] Bicyclo	29.6	1058	81.1
22	Heptan-2-ol[2,2,1] Bicyclo	51.6	1076	29.1
23	3-cyclo hexen-1-ol	63.6	1087	60.0
24	α.terpineol	77.6	1189	12.3
25	2,6-dimethyl-3,5,7-octatriene	90.6	1121	14.2
26	Cyclo pentane	13.7	1161	61.0
27	Trans-Geraniol	40.7	1210	70.0
28	Dione-1,6-nonene[4,4]spiro	60.7	1252	61.0
29	Endobornylacetate	81.7	1259	05.1
30	4,8-dimethyl-nona-3,8-dien	89.7	1306	62.0
31	2-acetylcyclopentanone	12.8	1329	72.0
32	1,3-cyclopantadiene	18.8	1335	67.0
33	4-methyl-2-(3-methyl-butanyl)	85.8	1403	62.2
34	1-cyclopropyl	93.8	1412	64.2
35	Trans-caryophyllene	20.9	1441	73.0
36	2,3-dimethyl amphetamine	63.10	1513	81.0
37	3-(2,2-dimethyl1-6-methylidene)	70.10	1520	18.2

Chemicals and Reagents

Helium, 99.999%, used as carrier gas was purchased from Roham Gas Company (Tehran, Iran). Alkane mixture consisting of the C8-C20 alkanes (concentration of 40 mg/mL in hexane) was purchased from Fluka. All other chemicals were of the highest purity available from Merck or Fluka. Doubly distilled deionized water was used.

GC analysis

GC analyses were carried out on a Shimutzu 17A gas chromatograph equipped with a FID and a BP-5 capillary column (30 m × 0.25 mm; 0.25 µm film thickness). The oven temperature was held at 60 °C for 3 min then programmed at 5°C / min to 300 °C. Other operating conditions were as follows: carrier gas, He with a flow rate of 5 ml/min; injector temperature, 230; detector temperature, 300 °C; split ratio, 1:8.

GC-MS analysis:

GC/MS analyses were performed on a Agilent 6890series GC system coupled with Agilent 5973 Network Mass selective detector Mass system and a BP-5 capillary column (30 m × 0.25 mm; 0.25 m film thickness). The operating conditions were the same conditions as described above but the carrier gas was He. Mass spectra were taken at 70 eV. Mass range was from *m/z* 50–500 amu. Quantitative data were obtained from the electronic integration of the FID peak areas. The components of the oils were identified by comparison of their mass spectra and retention indices[3] and presented in the MS computer library (WILEY229.L and NIST 1988).

Identification of compounds

Retention indices were calculated by using retention times of n-alkanes that were injected after the oils under the same chromatographic condition. The components were identified by comparison of their mass spectra with the Wiley library, or with the published mass spectra. The quantification of each compound was based on peak area method without using correction factor.

Qualitative and quantitative analyses

Most constituents were identified by gas chromatography through comparison of their retention indices (RIs)[4-6] or with those of authentic compounds available in our laboratories. The retention indices (RIs) were determined in relation to a homologous series of n-alkanes (C8–C24) under the same operating conditions. Further identification was made by comparison of their mass spectra on both columns with those stored in NIST 98 and Wiley 5 Libraries or with mass spectra[7]. Component relative concentrations were calculated based on GC peak areas without using correction factors.

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