

COMPOSITION OF THE ESSENTIAL OIL OF *PYCNOCYCLA SPINOSA* DECNE. EX. BOISS. FROM ISFAHAN

GHOLAMREZA ASGHARI*, GHOLAMALI HOUSHFAR**
and ZAHRA MAHMOUDI*

*Department of Pharmacognosy and **Department of Medicinal Chemistry, Faculty of Pharmacy and Pharmaceutical Sciences, Isfahan University of Medical Sciences, Isfahan, Iran

ABSTRACT

The hydrodistilled aerial parts oil of *Pycnocycla spinosa* var. *spinosa* was analyzed by GC and GC/MS. Thirty three components were identified. Geranyl isovalerate (14.9%), caryophyllene oxide (10.6%), α -eudesmol (9.2%) β -citronellol (7.2%), elemicin (6.8%), p -cymene (4.7%), citronellyl acetate (4.3%), and α -cadinol (3.3%) were found as major components.

Key words: *Pycnocycla spinosa*, *Umbelliferae*, Essential oil composition, Geranyl isovalerate, Caryophyllene oxide.

INTRODUCTION

The genus *Pycnocycla* (Umbelliferae) has eight species in Iran. *Pycnocycla spinosa* Locally known as Sagdandan Khardar, is distributed in central parts of Iran (1). Literature search has not revealed any previous work on the aerial part oil of *P. spinosa*. However, the fruit oil from *P. spinosa* has been studied, in which elemicin (65%), linalyl acetate (11%), and β -eudesmol (4%) have been found (2).

MATERIALS AND METHODS

Plant materials:

Aerial parts of *Pycnocycla spinosa* var. *spinosa* were collected from Isfahan University campus and was identified by the botanist Mr. Mehregan in Department of Biology at Isfahan University (3). Voucher specimens (A24) have been deposited at the Herbarium of the Department of Pharmacognosy, Faculty of Pharmacy and Pharmaceutical Sciences, Isfahan, Iran.

Isolation of the essential oil:

The air-dried aerial parts, prepared at the flowering stage of the plant, were subjected to hydrodistillation for 4h using a clevenger-type apparatus to produce oils in 0.1% yield.

GC Analysis:

Gas chromatography analysis was carried out by a Perkin-Elmer 8500 gas chromatograph with FID detector and a BP-1 capillary column (39m x 0.25mm; film thickness 0.25 μ m). The carrier gas

was helium with a flow rate of 2 ml/min, the oven temperature for first 4 min was kept at 60°C and then increased at a rate of 4°C /min until reached to the temperature of 280°C; injector and detector temperatures were set at 280°C.

GC/MS Analysis:

The mass spectra were recorded on a Hewlett Packard 6890 MS detector coupled with Hewlett Packard 6890 gas chromatograph equipped with HP-5MS capillary column (30m x 0.25mm; film thickness 0.25 μ m). The GC condition was as mentioned above. Mass spectrometer condition was as follow: ionized potential 70 eV, source temperature 200°C.

The identification of the constituents was based on computer matching against the library spectra Wiley 275 L built up using pure substances and components of known constituents, MS literature data and evaluation of fragmentation patterns of compounds and confirmed by their GC retention times (4). The percentage of composition of the essential oil computed from GC peak areas without using correction factors. A series of hydrocarbon standards (C₉-C₁₈) were also used to calculate Kovats indices from the GC analysis (4, 5). Kovats Indices were calculated by the Kovats equations.

RESULTS AND DISCUSSION

The chemical composition of the aerial parts oil of *P. spinosa* are presented in Table I. A total of 33 components were identified with a yield higher

than 0.1%. The main constituent was geranyl isovalerate (14.9%) followed by caryophyllene oxide (10.6%), α -eudesmol (9.2%), β -citronellol (7.2%), and elemicin (6.8%). The examined oil possessed different chemical composition in comparison with the *P. spinosa* fruit oil (2).

Quantitatively, the major components were monoterpene esters (21.8%) followed by terpenic alcohols (20.6%). The oil was found to contain monoterpene hydrocarbons (11.5%) and sesquiterpene hydrocarbons (3.9%).

The terpenic oxide, caryophyllene oxide accounted for (10.6%). Methyl eugenol and elemicin were also two phenylpropanoids found in the oil.

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Table 1. Composition of essential oil of *Pycnocycla spinosa*

Compound	%	Kovats indices
α -Thujene	0.2	925
α -Pinene	0.5	932
Camphene	0.1	946
Sabinene	2.9	972
β -Pinene	0.7	976
Octanal	2.2	1004
<i>p</i> -Cymene	4.7	1025
Limonene	1.1	1028
trans- β -Ocimene	1.2	1048
γ -Terpinene	0.1	1056
Linalool	0.6	1101
Nonalal	0.3	1104
<i>p</i> -Cymen-8-ol	0.3	1186
Decanal	1.3	1204
β -Citronellol	7.2	1235
Bornyl acetate	0.9	1286
Citronellyl acetate	4.3	1353
α -Copaene	0.7	1372
Methyl eugenol	1.3	1408
β -Caryophyllene	1.1	1418
α -Humulene	0.4	1454
β -Ionone	0.3	1485
δ -Cadinene	1.5	1522
α -Calacorene	0.6	1542
Elemicin	6.8	1563
Citronellyl pentanoate	1.73	1584
Caryophyllene oxide	10.6	1587
Geranyl isovalerate	14.9	1620
α -Cadinol	3.3	1650
α -Eudesmol	9.2	1660
Heptadecane	0.6	1701
Octadecane	1.1	1805
Nonadecane	3.0	1912

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