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Volatile Constituents of Zhumaria Majdae

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ABSTRACT

Capillary gas chromatography mass spectrometry (GC'- MS) analyses of a sample of essential oil of zhumaria Linalool ned by simple water distillation of the pulverized air - dired leaves and flowers of the plant indicated that Linalool and comphor are the two major constituents of the volatile oil. Sylvestrene , γ - terpinene, $\propto$ - Pinene, γ - carene, camphene, and Epiborneol constitute the other main components of the essential oil. The GC - MS chromatogram indicated the presence of more than fifty - components in the oil, most of them were present in trace amounts. In this study, the chemical structures of twenty of these consti tuents were elucidated using GC - MS analysis.

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INTRODUCTION

The monotypic Iranian Zhumaria Majdae (Labiatae) has Long been known by the local people of southern region of Iran (Bander Abbas) as Mohr - e- Khosh due to its very pleasant scence as well as its pharmacuntical applications mainly as an emmenagogue agent (1) . As a part of our screening program for local plants and for herbs with this property, we aimed to investigate the phytochemistry of zhumaria Majdae. The presence of two mo noterpenes, a triterpene. and two flavenoids has already been published (2). However, no report is available concerning the chemical constituents of the essential oil. This paper present the result of an investigation of the essential oil obtained by simple distilation of the leaves and flowers of zhumaria Majdae collected in Mid spring seasɔn from Bander Abbas.

EXPERIMENTAL

Material - The plant material was collected in its flowering time from Kuh - e Genou in Bander Abbas, In Mid spring time. A voucher specimen is present at the Herbarium of the botanical garden of the Research Institute of Forest and Rangelands of Iran. The air - dried plant materials were divided into leaves/ flowers and stems. The separated materials were pulverized and 100 gram of each sample was subjected to simple water distilla tion. The distilations hava been achieved in 2 upu to 4 hours and the separated essential oil has been dried over dehydrated sodium Sulfate. The samples have been Kept at - 20°C till the time of analyses.

GC - MS analyses - GC - MS analyses were achieved using a Finnigan Mat mass spectrometer (Model / 4600)eqyuibed with a microcomputer and a library spectra search software. The GC analyses were done under the folylowing conditions: An OV - 1 column of 30.0 m x 0.24 mm I. D. was used. The oven initial tempertvre was set at 50°C and kept as such for one Minute after injection of 2ul of the sample. The temperatare of the oven was then increased up to 120°C at a rate of 3°C / Min and finally to 250 °C at a rate of 5°C / Min. The iniector port temp was set at 250°C and the carrier gas was Helium at a flow rate of 20 cm^3 / Min with a split ratio of 1: 50 . The mass spectra were recorded under EI conditions with an electron energy of 70 ev, ionization current of 60 u A with an ion source temp of 250°C.

RESULTS ANE DISCUSSION

GC - MS analyses of each pulverized samples of leaves/ flowers and stems showed the presence of more than fifty components in each mixture. Most of the constituents were present in trace amounts and we primarily decided to work on the structure elucidation of the more aboundant components of the volatile oil . our data showed the presence of more essential oil in leavel flower sections of the plant than in the stems with

no significant difference in the pattern of the corresponding GC/ MS chro matgrams (data not presented). Therefore, we aimed to analyse the volatile oil obtained from leaves/ flowers. It was found that the pulverized samples contained 2.2% and the green plant material contained 2.8% of essential oil.

As shown in figure 1, the peaks corresponding to scan numbers of 295 and 331 constitute the major components of the essential oil obtained from fresh plant material. These peaks represent, respectively, Linalool and comphor. The other main components of the same volatile oil are sylvestrene, terpinene, $\propto$ - pinene, Δ - carene, camphene, and Epiborneol. The complete list of the identified components along with their corresponding molecular weights is presented in table 1. The GC- MS analyses of the essential oil obtained from the sun dried plant material (which is the usual form used in folk med.) indicated that the fresh plant material contains more Δ - carene and the sun - dried plant material contained more camphor. These observations are probably due to the efficiency of oil chemical from the pulverized vs. green plant materials. In addition no lemonene was detected in the essential oil obtained from sun - dried plant material.

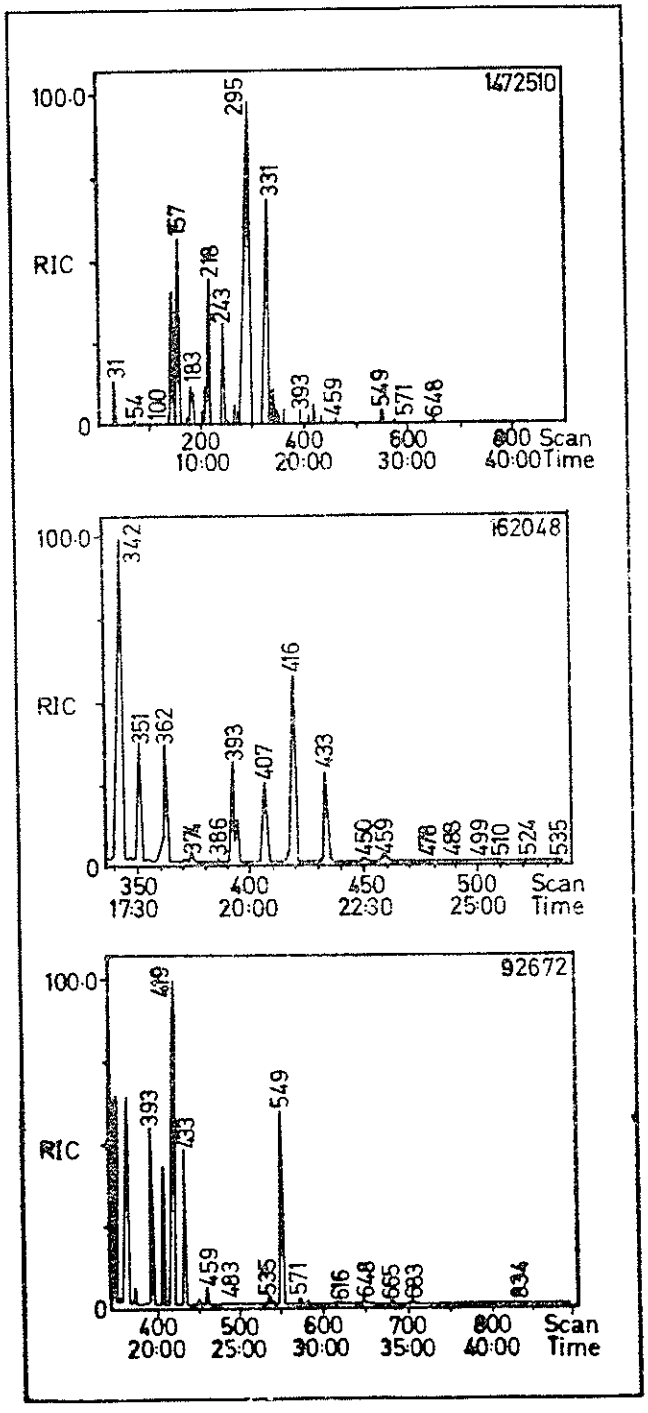
In order to indentify as many constituents as possible, we fractionated a sample of the volatile oil, obtained from the sun - dried pulverized plant materials, on a silica Gel col umn using a mixture of Hexane : $CHCl_3$, as the eluting solvent, with varying ratios. The GC - MS analysis of the fraction eluted with Hexane: CHC_3 (40: 60) indicated the presence of phytol in the essential oil. This component has not been deteted in the crude oil sample.

Our investigation indicated that the majurity of the chemica constituents of the essential oil of Zhumaria Majdae are nonaromatic compounds. The majurity of the identifed comonents are monoterpenes and about half of the identified monoterpenes are oxygenated.

Table 1- Composition of the essential oil of green Zhumaria Majdae (according to Figure 1).*

Scan no.	Name	Molecular formula	MW
146	∝ - pinene	$C_{10}H_{16}$	136
157	Sylvestrene	$C_{10}H_{16}$	136
175	Linalool propanoate	$C_{13}H_{22}O_2$	210
186	Camphene	$C_{10}H_{16}$	136
206	Lemonene	$C_{10}H_{16}$	136
218	γ - terpinene	$C_{10}H_{16}$	136
243	Δ - Carene	$C_{10}H_{16}$	136
295	Linalooll	$C_{10}H_{18}O$	170
331	Camphor	$C_{10}H_{16}O$	152
342	Epiborneol	$C_{10}H_{18}O$	152
362	∝- Terpineol	$C_{10}H_{18}O$	154
392	Methylnerolether	$C_{10}H_{20}O$	168
395	Nerol	$C_{10}H_{18}O$	154
433	Citral a	$C_{10}H_{16}O$	152
459	isothymol	$C_{10}H_{14}O$	150
549	∝ - Caryophyllene	$C_{10}H_{24}$	204

* The structure assignments have been mainly achieved by comparison of the mass spectra with the finnigan Library of spectra and the mass spectra of the authentic samples.



Figurel. GC - MS Chromatogram of the essential oil of zhumaria Majdae obtained from the green plantmaterial. For experimental GC - Ms conditions refer to the experimental section.

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