Chemical Composition Of The Essential Oil Of Heracleum Persicum Seeds Of Iran

Avat (Arman) Taherpour
Chemistry Department, Graduate School, Islamic Azad University, P.O.Box 38135-567, Arak Branch, Arak, (IRAN)

†Unusual Molecule and Reactive Intermediate
Group, Chemistry Building, School of Microbial & Molecular Sciences, The University of Queensland-QLD 4072, Brisbane, (AUSTRALIA)
E-mail: a.taherpour@uq.edu.au

Ramin Karimzadeh
Chemistry Department, Graduate School, Islamic Azad University, P.O.Box 38135-567, Arak Branch, Arak, (IRAN)

ABSTRACT

The volatile chemical constituents of the essential oil of Heracleum Persicum seeds, that is growing wild in Ardebile-Iran were investigated by GC and GC/MS technique. Twenty-nine compounds, representing 75% of the total oil were identified and 12 unknown compounds detected. The main components were: hexylbutyrate(37.7%), hexylbutanoate(36.7%), octylacetate(16.3%), hexyl-2-methylbutanoate(5.7%), hexylisobutyrate(4.7%), heptyl-2-methyl-butyrate(2.3%), n-butyl-butyrate(2.25%), hexylvalerate(1.9), octyl-butyrate(1.7%) and linalole(1.5%).

INTRODUCTION

Heracleum genus has 10 species in Iran. H.persicum desf. ex fischer (syn. H.pubescens Rech., H.glabrescens boiss. and hohen.) (Apiaceae) is an annual herb, indigenous to the alborz region, the northern part of Iran, where it grows at an altitude ranging from 2000 to 3000m[1-4]. The genus heracleum are noted for their rich furanocoumarin content. Furanocoumarins are effective dermal photosensitizing agents, and are widely used in the treatment of leucoderma and in various ‘suntan’ lotions. Heracleum Persicum desf (umbellifereae) is an annual plant which grows in the northern parts of Iran. The seeds of this plant is...
used as spices and the young stems are used for making pickles. The *Heracleum persicum* materials of this study were collected from ardebil-Iran in agu. of this year. A voucher specimen has been deposited in herbarium of research institute of forest and rangelands, ardebil, Iran. Its fruits are used commonly in Iran as spices, while the fruits and the young shoots are used in the preparation of pickles. From the aerial parts of this herb, especially the fruits were administered because of their carminative activity in local medicine by folks.

**Analytical methods**

Dried aerial parts of *Heracleum persicum* were subjected to hydrodistillation for 5 hours using clevenger-type apparatus to produce yellow oil in 0.28%(w/w) yield. The oil of the aerial parts of *Heracleum persicum* was examined by GC/MS(GC:HP 6890, MS:HP 5973), column(HP5-MS, 30m×0.25mm fused silica capillary column, film thickness 0.32µm) by temperature program 60°C(3 min)-210°C(2min) at the rate of 6°C/min(injection temperature 250°C, carrier gas: helium(with purity 99.999%), detector temperature 150°C, ionization energy in mass was 70eV, mass range 10-300 amu, and scan time was 1 sec.

The list of identified components is presented in TABLE-1. The constituents were identified by comparing their MS spectra with those in computer library or with authentic compounds. The identifications were confirmed by comparison of their retention indices either with those of authentic compounds or with data in the literature.

In the aerial parts of *Heracleum persicum* the major identified components and the relative amounts based on peak area were: hexylbutyrate(37.7%), hexylbutanoate(36.7%), octylacetate(16.3%), hexyl-2-methylbutanoate(5.7%), hexylisobutyrate(4.7%), hexylhexanoate(4.3%), heptyl-2-methylbutyrate(2.3%), n-butylbutanoate(2.25%), heptylvalerate(1.9), octylbutanoate(1.7%) and linalole(1.5%).

**DISCUSSION**

Plants from genus *Heracleum* have been previously studied and reported in the literature. There are some nice studies of the chemical composition of essential oil of *Heracleum* species. A report in literature shows that roots of *Heracleum persicum* have been investigated because of their of furanocoumarins; five of which compounds were isolated and identified. The literature survey presence of such compounds in leaves and seeds of this species. From the diethyl ether extracts of the fruits of *Heracleum persicum*, an aglycone was identified which was demonstrated to be quercetin. In this investigation, the volatile constituents of the essential oil of *Heracleum persicum* growing wild in ardebile-Iran were investigated by GC and GC/MS technique. As could see in TABLE 1, two component i.e. hexylbutyrate(37.7%) and hexylbutanoate(36.7%) have the highest percentage and more than 35% among the known compounds in the essential oil of this herb. Some other components like octylacetate(16.3%) and hexyl-2-methylbutanoate(5.7%), are located in the second level of the concentration in the essential oil. Although, in accordance with the data in TABLE 1, some components i.e. hexylisobutyrate(4.7%), hexylhexanoate(4.3%), heptyl-2-methylbutyrate(2.3%), n-butylbutanoate(2.25%), heptylvalerate(1.9), octylbutanoate(1.7%) and linalole(1.5%) have the medium up to low relative percentages, could see some important compounds with effects like mold and mildew preventive, microscopy, preservative and antioxidant with percentages under 1.5%. Biological and aroma effects of the main and minor compounds of the essential oil of *Heracleum persicum* are discussable in terms of their possible use in medicine, cosmetics and foods. Perhaps, the high densities of the main compounds give some biological activities to the essential oil or to this herb. Although no records of toxicity have been found for this plant, it belongs to a family that includes many poisonous plants so some caution is advised.

**CONCLUSION**

*Heracleum persicum* is one of the *Heracleum* genus of that was collected from west area in Iran. It is utilized as the medicinal herb for the various purposes in local and traditional medicine by folks in Iran. Twenty-nine compounds, representing 75% of the total oil were identified and 12 unknown compounds detected.
### TABLE 1: Essential oil constituents of *Heracleum persicum*

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of Compounds</th>
<th>Scan</th>
<th>KI*</th>
<th>RT**</th>
<th>%</th>
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<tbody>
<tr>
<td>1</td>
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<td>846.478</td>
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</tbody>
</table>

* Kovats index; ** Retention time
These components were identified by GC and GC/MS technique. In this herb, hexylbutyrate (37.7%) and hexylbutanoate (36.7%) have the most percentages among compounds of the essential oil. Some other components like octylacetate (16.3%) and hexyl-2-methylbutanoate (5.7%) are located in the second level of the concentration in the essential oil. The folks in common medicinal have been used from the aerial parts of this herb because of their carminative activity.

REFERENCES