

Separation and Identification the Speciation of the Phenolic Compounds in Fruits and Leaves of Some Medicinal Plants (*Juniperus phoenicea* and *Quercus coccifera*) Growing at Al –Gabal Al –Akhder Region (LIBYA).

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ABSTRACT

The contents of the phenolic compounds can be summarizing as following :*Juniperus phoenicea* leaves :4,5-Dicaffeoly guinic acid (0.003047 mg/g), Cinnamic acid (0.0000696 mg/g), Galic acid (0.0161mg/g) Geraniol (0.000644 mg/g), Phloridzin (0.0000297 mg/g), Quercetin (0.02033 mg/g) and Catecin (0.0424 mg/g). On the other side in *Juniperus phoenicea* fruits: 3,4-Dicaffeoly guinic acid (0.00115 mg/g), Galic acid (0.0000975 mg/g and Catecin (0.0424 mg/g). While in *Quercus coccifera* plan : The concentrations were fluctuated as following: *Quercus coccifera* leaves: Chlorogenic acid (0.0115 mg/g), 3,4- Dicaffeoly guinic acid (0.129 mg/g), 3,5-Dicaffeoly guinic acid (0.309 mg/g), 4,5- Dicaffeoly guinic acid (0.0161 mg/g), 2,5-dihydroxy Benzoic acid (0.0000589mg/g), and Galic acid (0.166mg/g). While in *Quercus coccifera* fruits the contents were recorded as following: (0.0197 mg/g), (0.102 mg/g), (0.132 mg/g), (0.205 mg/g), and cinnamic acid (0.000698mg/g).

Keywords: Medicine plants , Phenolic compounds, Libya.

INTRODUCTION

Medicinal plants in Libya

North Africa includes Algeria, Egypt, Libya, Morocco, Mauritania and Tunisia The region consists of the biota of semi-closed Mediterranean and Red seas, with diverse ecosystems constituting About 10,000 vascular plant species. It has arid, Semi-arid and a range of sub-climatic zones. The Mediterranean basin is one of the 25 internationally recognized biodiversity hot spots in the world and it has extraordinary plant diversity and species endemism. Morocco has the highest rate of species endemism in the regio.

About 70% of plant species found in the wild have medicinal, aromatic and other uses. Over 10% of these have the potential

for commercial exploitation as a source of drugs and pharmaceuticals.

Medicinal plant Resources

In Libya there are about 1,825 vascular plant species, of which 134 are endemic. About 450 species are reported to be of medicinal value. Some important plant families are Apiaceae, Asteraceae, Lamiaceae, Poaceae, Fabaceae, Brassicaceae and Abiaceae. Medicinal plants are distributed all over the country especially in the Al-Jabel Al-Akhdar, Ghadames, Gharian, Awbari and Tarhona regions. (Rateeb *et al*) More than 100 species are extensively used by Bedouins and local people in folk medicine drinks, or chewed fresh or dry.

DOI: 10.5530/ijper.51.3s.34

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They are used to cure dermal diseases, viral or bacterial infections, insect or animal bites, burns and sometimes to treat hair problems. These medicinal plants are very well documented in different floras (El-Gadi and Bshana). Many species of medicinal plants such as *Cupressus sempervirens* L., *Pinus halepensis* Mill., *Juniperus phoenicea* L., *Quercus coccifera* L., *Asperula arvensis* L., *Tribulus longipetalus* Vin., *Veronica cymbalaria* Bodard and *Vahlia dichotoma* (Murray) Kuntze are threatened because of over-harvesting and diversion of forest land to agriculture (Al- Idrissi *et al*). There is an urgent need to initiate programmers for collection and conservation of endangered and rare plant species to save them from extinction as a result of heavy grazing, human use and drought hazards that occur with increasing frequency. The most famous medicinal plant of Libya is Silphium cyrenaicum (now extinct). It existed during Greek and Roman times (900 to 100 B.C.). It was used for the treatment of many illnesses and was so important to the economy that was sold by weight with silver or gold and it was depicted on coins (Rateeb *et al*). It has been reported that Silphium grew abundantly in Cyrenacia (Al-Jabel Al- Akhdar region) but heavy exploitation led to its extinction hundreds years ago. Many scientists have suggested different species for Silphium, but their suggestions are questionable. The herbal medicines most in demand are chamomile, thyme and rosemary. Libya exports medicinal plants to Egypt. Trade is handled by the private sector. About 30% of the population relies on traditional medicine in Libya. The Ministry of Health is planning to establish herbal medicine clinics as well as good manufacturing practices in the production of herbal medicinal products, which are mostly imported from Italy and other European countries. There is a lack of information on formal trade of medicinal and aromatic plants in the northern east side of Libya. This study aimed to separation and determination the phenolic compound in two medicinal plants (*Juniperus phoenicea* and *Quercus coccifera*) collected from al –gabal al –akder region (Libya).

MATERIALS AND METHODS

Sampling

Selection of medicinal plants for this study

Four different plants samples were collected from Al-Gabel Al –Kadar Region during spring 2015 Season, the- Samples including:

(*Juniperus phoenicea* and *Quercus coccifera*)

Samples preparation

Leaves and fruits of every type of Plant were separated and washed with distilled water several times, then dried in open air for fifteen days.

Taxonomical investigation:

The samples were identified by herbarium samples kept in seliphium herbarium, Faculty of Science, Omar Al Mokhtar University LIBYA.

The phenolic compounds analysis:

5 gram of powdered extracted for 30 minutes with 20ml mixture of chloroform methanol (2:1) and filtered. The marc (remained powdered) re extracted three times as mentioned (chloroform/ methanol) Combine the extracts and washed with distilled water. The extracted layer was concentrated to residue. (Chaman and Jangaard). The analysis of the compounds were carried out by phenolic compounds were identified by using GC –Mass instrument in Faculty of Science, Alexandria University, Egypt.

Phenolic acids content:

The types and contents of Phenolic compounds of studied plants are shown:

Tables 1 and Figures (1, 2, 3, 4, 5 & 6), the results may be summarized as following:

RESULTS AND DISSCUTION

***Juniperus phoenicea*:** The concentration of phenolic acids in leaves and fruits of *Juniperus phoenicea* as following:

***Juniperus phoenicea* leaves:** 4,5-Dicaffeoly guinic acid (0.003047 mg/g), Cinnamic acid (0.00000696 mg/g), Galic acid (0.0161mg/g) Geraniol (0.000644 mg/g), Phloridzin (0.00000297 mg/g), Quercetin (0.02033 mg/g) and Catecin (0.0424 mg/g).

***Juniperus phoenicea* fruits:** 3,4-Dicaffeoly guinic acid (0.00115 mg/g), Galic acid (0.0000975 mg/g and Catecin (0.0424 mg/g).

***Quercus coccifera*:** The concentration of phenolic acids in leaves and fruits *Quercus coccifera* as following:

***Quercus coccifera* leaves:** Chlorogenic acid (0.0115mg/g), 3,4-Dicaffeoly guinic acid (0.129 mg/g), 3,5-Dicaffeoly guinic acid (0.309 mg/g), 4,5-Dicaffeoly guinic acid (0.0161 mg/g), (,2,5-dihydroxy Benzoic acid (0.00000589 mg/g), and Galic acid (0.166mg/g).

***Quercus coccifera* fruits:** Chlorogenic acid (0.0197 mg/g), 3,4-Dicaffeoly guinic acid (0.102 mg/g), 3,5-Dicaffeoly guinic acid (0.132 mg/g), 4,5-Dicaffeoly guinic acid (0.205 mg/g), and cinnamic acid (0.00000698mg/g).

From the results which recorded in this study, the leaves containing different types of phenolic compounds comparing with the fruits. The caticen compound was recorded high content in *Juniperus phoenicea* leaves compared with

Table 1: Phenolic compound contents in <i>Juniperus phoenicea</i> and <i>Quercus coccifera</i> (leaves and fruits)				
Plants	<i>J. phoenicea</i>		<i>Q.coccifera</i>	
	leaves	fruits	leaves	Fruits
Chlorogenic acid	–	–	0.0115	0.0197
Caffeic acid	–	–	–	–
3,4-Dicaffeoyl guinic acid	–	0.00115	0.129	0.102
3,5-Dicaffeoyl guinic acid	–	–	0.309	0.132
4,5-Dicaffeoyl guinic acid	0.003047	–	0.0161	0.205
2,5-dihydroxy Benzoic acid	–	–	0.00000589	–
Cinnamic acid	0.00000698	–	–	0.00000698
Galic acid	0.0161	0.0000975	0.166	–
Geraniol	0.000644	–	–	–
Tanic acid	–	–	–	–
Phloridzin	0.00000297	–	–	–
Quercetin	0.02033	–	–	–
Catecin	0.0424	0.0083	–	–

Figure 1: *Juniperus phoenicea* leavesFigure 2: *Juniperus phoenicea* fruitsFigure 3: *Quercus coccifera* leavesFigure 4: *Quercus coccifera* fruits

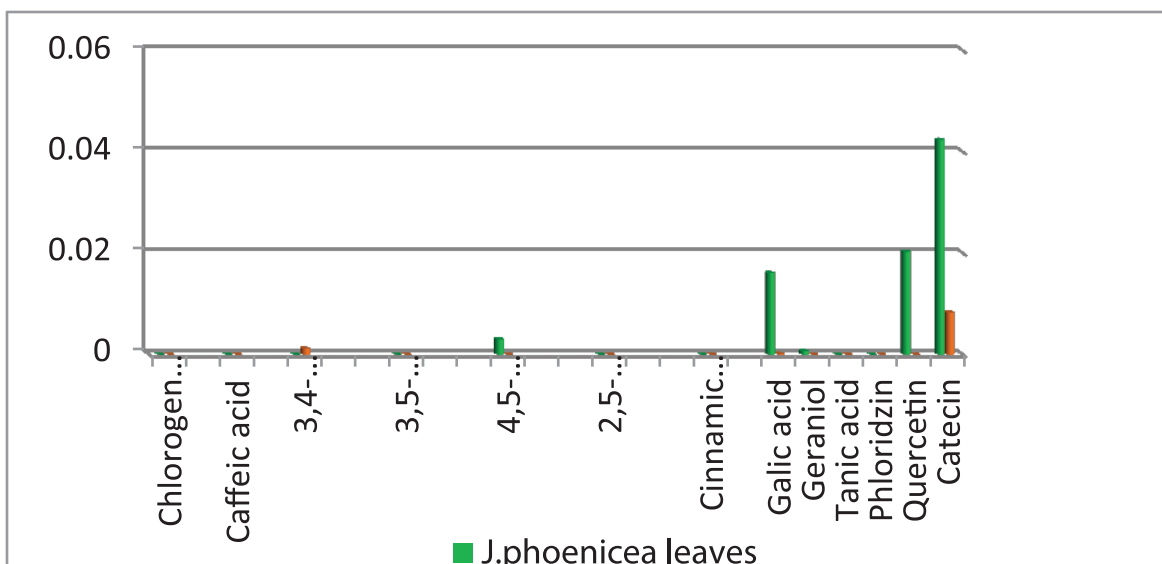


Figure 5: Phenolics content in *Juniperus phoenicea* leaves and fruits.

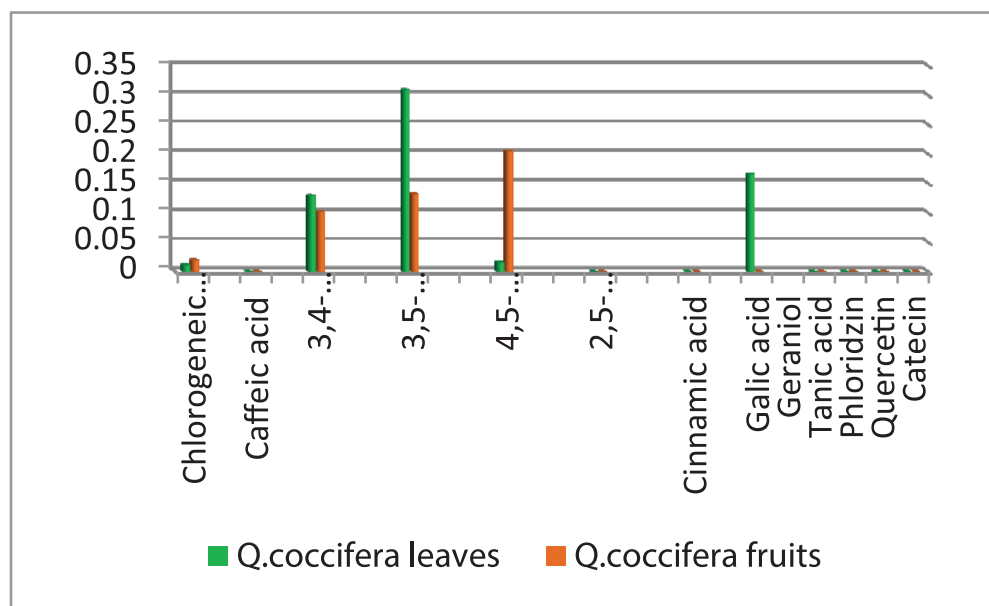


Figure 6: Phenolics content in *Quercus coccifera* leaves and fruits.

the other compounds. On the side the 3,5-Dicaffeoyl quinic acid recorded high content in *Quercus coccifera* leaves. Also the results showed that the leaves of *Quercus coccifera* compared with *Juniperus phoenicea* leaves. This study is mainly the first study which recorded the speciation of phenolic compounds of the plants under investigation, where no results were published on the two plants. But some studies which carried out on some Libyan plants recorded presence of phenolic compounds in many Libyan plants but without gave the types of them.

CONCLUSION

The studied plants recorded different types and contents of phenolic compounds in leaves and fruits, many of phenolic compounds were not recorded. The leaves containing important values comparing with fruits.

ACKNOWLEDGEMENT

The authors are highly thank the central lab of chemical analysis of omar El -Mukhtar University, LIBYA

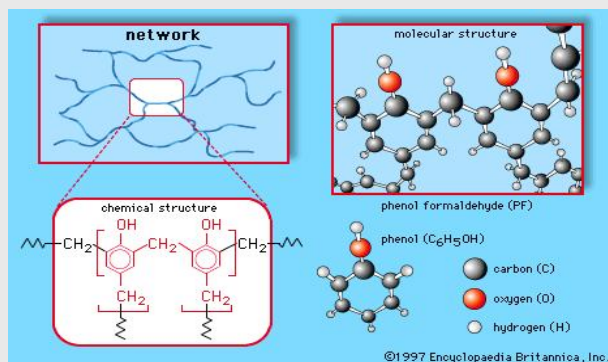
CONFLICT OF INTEREST

None

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PICTORIAL ABSTRACT



SUMMARY

- Phenolic compounds, Medicine plants
- The leaves contain high contents.
- The gallic acid was recorded in most samples.
- The high content of the recorded was related to 3,5-Dicaffeoyl guinic acid in *Q.coccifera* plant leaves.

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Cite this article: Hamad MAH & Aisha MRA. Separation and Identification the Speciation of the Phenolic Compounds in Fruits and Leaves of Some Medicinal Plants (*Juniperus phoenicea* and *Quercus coccifera*) Growing at Al –Gabal Al –Akhder Region (LIBYA). *Indian J of Pharmaceutical Education and Research.* 2017;51(3)Suppl:S299-303.