Uses & Soxhlet Extraction of Apigenin from Parsley (Petroselinum Crispum)


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ABSTRACT
Herbal drugs are cultivated in large quantities all over the world, and they are gaining the popularity because of good efficacy, safety and less side effect. Herbal drug have great importance and demand at worldwide levels for healthcare and parsley is one of them. From the decades ago parsley is using as a flavouring agents, as parsley is an herbaceous vegetable used as foodstuff, spice and medicinal plant. The aim of Study is to obtain a plant profile, chemical constituents, pharmacological activity and health benefits of the parsley plant. Various Study detected various active compounds in parsley plant and they show various pharmacological activities such as antibacterial, antifungal, analgesic, diuretic, hypotensive, gastro protective, immunosuppressant, antioxidant, hepatoprotective, anti-diabetic and use in the treatment of amenorrhea, dysmenorrhea, gastrointestinal disorder, urinary disorder, diabetes and various dermal diseases in traditional and folkloric medicine. Parsley is an ayurvedic medicine use in the treatment of asthma, coughs, eye complaints, jaundice, gout, oedema, bladder infections menstrual problems and plague. Flavonoids like apigenin, chrysoeriol and quercetin are chief components in Petroselinum crispum plant.

KEYWORDS: Petroselinum crispum, parsley, flavonoids, herbal, antioxidant and Apigenin

INTRODUCTION
Parsley (Petroselinum crispum (Mill)) belongs to family Apiaceae. It is an aromatic herb used in food and drug industries. The essential oil (EO) is present in various organs of the plant such as leaves, roots and mature seeds (fruits). Parsley EO is used as a natural additive (flavouring agent) in food products and as fragrance in cosmetics or perfumes. Different biological activities such as anti-microbial, diuretic and weak antioxidants were found in parsley EO. The major component (Myristicin) of parsley EO is a potential cancer chemo protective agent.[1] Parsley it is also called as Petroselinum crispum. Parsley is native to Europe and Western Asia (Bailey and Bailey, 1976) and cultivated in the United States as an annual for its aromatic and attractive leaves. The two major types of parsley are the common or curly leaf parsley and the flat leaf, Italian parsley. A third lesser grown parsley type is the Hamburg or turnip-rooted parsley, which is cultivated to a limited extent for its enlarged edible root. Fresh, dried, and dehydrated leaves are used as a condiment, garnish, and flavouring ingredient. A fixed oil and an essential oil can be extracted from the leaves and seeds. The essential oil of parsley is used as a flavoring agent or fragrance in perfumes, soaps, and creams. The commercial essential oil of parsley is largely derived from the seed or the herb harvested at seed formation.[2]

Petroselinum crispum is also used in cosmetics industries mainly in China, Mexico, South America, India and South-East Asia. In India it got cultivated in Jammu and Kashmir, Punjab, Uttarakhand, Uttar Pradesh, Maharashtra and Karnataka states. Petroselinum Crispum leaves look like coriander leaves but the taste and aroma Hold opposing views. Petroselinum crispum contains small, dark seeds which contain volatile oil. In Britain, they prefer the Curly leaves forms for culinary purposes and on the continent Plain leaves varieties are preferred for garnishes and flavoring.[3,4]

The search terms were: "Parsley" or "Petroselinum crispum" or "Petroselinum hortense". Parsley has been used as carminative, gastro tonic, diuretic, antiseptic of urinary tract, anti-uro lithiasis, anti-dote and anti-inflammatory and for the treatment of amenorrhea, dysmenorrhea, gastrointestinal disorder, hypertension, cardiac disease, urinary disease, otitis, sniffle, diabetes and also various dermal disease in traditional and folkloric medicines. Phenolic compounds and flavonoids particularly apigenin, apiin and 6’-Acetylapin; essential oil mainly myristicin and apioil; and also coumarins are the active compounds identified in Petroselinum crispum.[55]


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Plant profile:
Synonym: Apium crsium Mill, Petroselinum crispum, Chemical constituents: Source of Antioxidant, folic acid, Vitamin K, C and A. The parsley is found to have the following chemical constituents ascorbic acid, carotenoids, flavonoids, coumarins, apirole, Apigenin, Myristicin, various terpenoic compounds, phenyl propanoids, phathalides, furanocoumarins and tocopherol. [5]

Chemical structure

<table>
<thead>
<tr>
<th>Apiole</th>
<th>Apigenin</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Chemical structure of Apiole" /></td>
<td><img src="image2" alt="Chemical structure of Apigenin" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Apiose</th>
<th>Myristicin</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image3" alt="Chemical structure of Apiose" /></td>
<td><img src="image4" alt="Chemical structure of Myristicin" /></td>
</tr>
</tbody>
</table>

Table 1: Taxonomical classification of Parsley plant [Petroselinum crispum]

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae - Plant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subkingdom</td>
<td>Trachobionta - Vascular plants</td>
</tr>
<tr>
<td>Superdivision</td>
<td>Spermatophyta - Seed plants</td>
</tr>
<tr>
<td>Division</td>
<td>Magnoliophyta - Flowering plants</td>
</tr>
<tr>
<td>Class</td>
<td>Magnoliopsida - Dicotyledons</td>
</tr>
<tr>
<td>Subclass</td>
<td>Rosidae</td>
</tr>
<tr>
<td>Order</td>
<td>Apiales</td>
</tr>
<tr>
<td>Family</td>
<td>Apiaceae - Carrot family</td>
</tr>
<tr>
<td>Genus</td>
<td>Petroselinum J. Hill - parsley</td>
</tr>
<tr>
<td>Species</td>
<td>Petroselinum crispum (Mill) Nyman ex. A.W. Hill - Parsley</td>
</tr>
</tbody>
</table>

How to grow parsley:
Breath freshener, bone strengthener, packed with flavour parsley is much more than just a garnish. Snip the curly variety into butters, stuffings and tabbouleh, or turn the flat-leaved kind into gremolata, hummus or pesto. You can even eat the roots. If you want to grow your own, parsley can be cultivated from seed outdoors and indoors. You can also buy small plants from garden centres, or try nurturing a supermarket herb indoors – though results can be very patchy. Give plants a bright spot on a balcony, patio or sunny windowsill. With some winter TLC, you can pick parsley all year round. [50]
Uses of parsley root
The root can be used to relieve flatulence and colic, due to its carminative action. Parsley can be used as a tasty breath freshener owing to its high chlorophyll content. It also speeds the healing of bruises and soothes tired and lustre-lacking eyes. The juice soaked in a pad can relieve earache and toothache. [8,9]

Use as flavouring agent
It is also used in daily life because Parsley (Petroselinum crispum) is an aromatic herb that has been used to give flavour and odour to dishes and salads for centuries [14]. In addition, Petroselinum crispum is now planted throughout the world due to its usage in the food industry, perfume manufacturing, soaps and creams[19]

Uses parsley leaf
Traditionally, Parsley leaf is used for treatment of constipation, flatulence, jaundice, colic, edema, rheumatism, diseases of prostate and liver. It has also been used as an aphrodisiac. [22] Based on traditional use of this plant in rheumatic and liver diseases, the present study as undertaken with an objective to scientifically validate the claim.[23]

Parsley Nutrition
Mostly used as a culinary herb, parsley nutritional benefits can be obtained even from consuming it in small amounts. Parsley offers outstanding amounts of vitamin C (ascorbic acid), the most popular antioxidant, even surpassing those of orange, strawberry and lime. This humble culinary herb also provides almost eight times the daily requirements for vitamin K (phyloquinone), which improves coagulation and promotes healthy bones[31-33]. Other important nutrients found in parsley are vitamin B9 (folate), which plays a key role in fetal development, red blood cells’ production, and iron absorption, as well as vitamin A (from betacarotene), necessary for health eyes and skin, along with adequate quantities of B-complex vitamins. Parsley is also an excellent source of iron, required for the creation of new red blood cells; and potassium, which is essential for the balance of body fluids. It also provides good amounts of calcium and zinc, which works with iron to make strong bones and fight anemia.[32]

Soxhlet extraction of Apigenin
Materials and methods
Plant material:- The experimental material in this study were dried parsley leaves (Petroselinum crispum) available in retail trade in market.[30] During the test material was stored in a dry and dark place in the original packages. Before extraction samples were crushed in mortar to increase the contents of extracted compounds.[26]

Preparation of extracts:-
The Soxhlet extraction technique was used as a reference method to evaluate the performance of UAE and MAE in extraction of apigenin from parsley leave. About 6.0 g of parsley powder with a 0.36 mm particle size was enclosed into the cartouche and placed it in the chamber of Soxhlet apparatus with 300 ml of ethanol. The extraction was carried out at 70°C for 6 h. For determination of apigenin content, the collected extract was analyzed by HPLC.
Food, Drugs and Cosmetics

Biostimulants by Aisha Mofeed Abdelhady Ahmed, show various pharmacological activities such as antibacterial, and many food stuffs for it’s flavour. The information presented above show that the plants profile, chemical constituents, pharmacological activities and on the basis of all these information it is proved that the parsley is an chemically active drug use in the treatment of various disorders. In these reviews the extraction of the Apigenin form parsley.

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High nutritional content and medicinal potential have recommended parsley forthousands of years, making it one of the most common herbs worldwide By HerbaZest Editorial Team Jan 18, 2020.

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Figure 1,2 & 3 available on given site aphotoofora.com

Figure 4 – available via license © Woodhead Publishing Limited, 2012

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Apiole:https://en.m.wikipedia.org/wiki/Apiole#/media/File%3AApiol_structure.svg.

Apigenin:https://en.m.wikipedia.org/wiki/Apigenin#/media/File%3AApigenin.svg

Apiose:https://en.m.wikipedia.org/wiki/Apiose#/media/Fi le%3AD-Apisode_structure.svg

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