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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 health care 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, dysmenorrhoea, gastrointestinal disorder, unrinary disorder, diabetes and various dermal diseases in traditional and folklore medicine. Parsely is an ayurvedic medicine use in the treatment of asthma, coughs, eye complaints, jaundice, gout, oedema, bladder infections menstrual problems and plagu. Flavonoids like apigenin, chrysoeriol and quercetin are chief components in Petroselinum crispum plant.

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

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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 China, Mexico, South America, India and South-East Asia. In India it got cultivated in Jammu and Kashmir, Punjab, Uttrakhand.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 content 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]

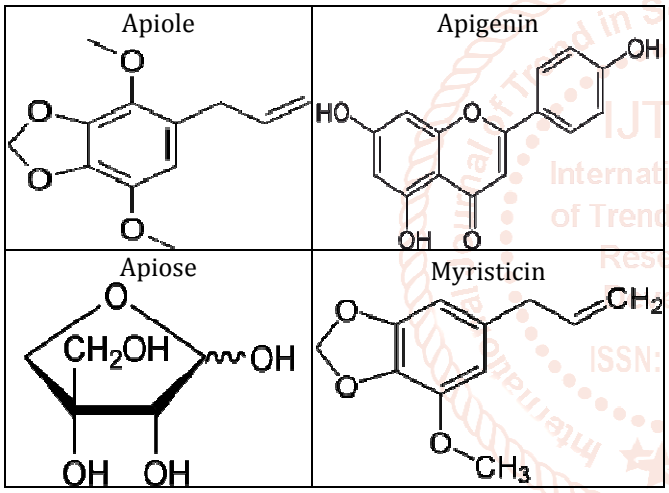
The search terms were: "Parsley" or "Petroselinum crispum" or "Petroselinum hortence". Parsley has been used as carminative, gastro tonic, diuretic, antiseptic of urinary tract, anti-urolithiasis, anti-dote and anti-inflammatory and for the treatment of amenorrhea, dysmenorrhea, gastrointestinal disorder,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

Fig.1. Parsley

Plant profile:

Synonym : Apium crispum 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, apiole, Apiose, Apigenin, Myristicin, various terpenoic compounds, phenyl propanoids, phathalides, furanocoumarins and tocopherol. [5]

Chemical structure



1.	Kingdom	Plantae - Plant
2.	Subkingdom	Trachobionta - Vascular plants
3.	Superdivision	Spermatoophyta - Seed plants
4.	Division	Magnoliophyta - Flowering plants
5.	Class	Magnoliopsida - Dicotyledons
6.	Subclass	Rosidae
7.	Order	Apiales
8.	Family	Apiaceae - Carrot family
9.	Genus	Petroselinum J. Hill - parsley
10.	Species	Petroselinum crispum (Mill) Nyman ex. A.W. Hill - Parsley

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

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]

Fig. 1. Parsely Growing indoor

Morphology:

Parsley is a biennial herb up to 80 cm long, hairless, with thin stems and triangular outline leaves two to three times pinnate, the upper leaves have entire leaflets and the basal ones serrated or toothed. The flowers grouped in umbels of 8-20 radios are yellowish green. [1]

Fig.3. Flowers of *Petroselinum crispum*

Fig.4. Seed capsules of *Petroselinum*

Fig.5 Dried parsley

Chopped fresh leaves are used in soups, stuffi ngs, minces, rissoles and also as a garnish over vegetables and salads. In German cooking, it is the most commonly used kitchen herb. In Turkey, parsley omelettes are very popular, and in the near east tabbouleh, a salad made from shredded wheat and parsley. In France, it is an indispensable component of omelette fi nes herbes and in Italy of ossobuco alla milanese (Milan veal shank). Italians also use parsley in rich tomato sauces and more delicate seafood preparations. It is an essential ingredient of Mexican salsa verde. Creole cuisine uses parsley to add a herbal lift to otherwise heavy recipes. Used together with celery, bell pepper and onion in fairly large amounts, parsley comprises the vegetal base to gumbos, rices and etouffees all over Louisiana. Parsley root is eaten on its own as a vegetable cut into slices (especially in the UK) or ooked together with other vegetables.

Use as traditional medicine

It is used in folk medicine as a digestive, colic, for relief of bladder inflammation and to treat kidney ailments, increase lactation, resume menstruation, lessen gum and dental pains andfor treatment of skin diseases.[15] In India, parsley is still used in traditional Ayurvedic medicine for stomach complaints, as a diuretic and as an expectorant. In Europe, parsley has been used to treat asthma, coughs, eye complaints, jaundice, gout, oedema, bladder infections menstrual problems and plague [8]

Uses of parsley root

The root can be used to relieve fl atulence 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 (phylloquinone), 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.

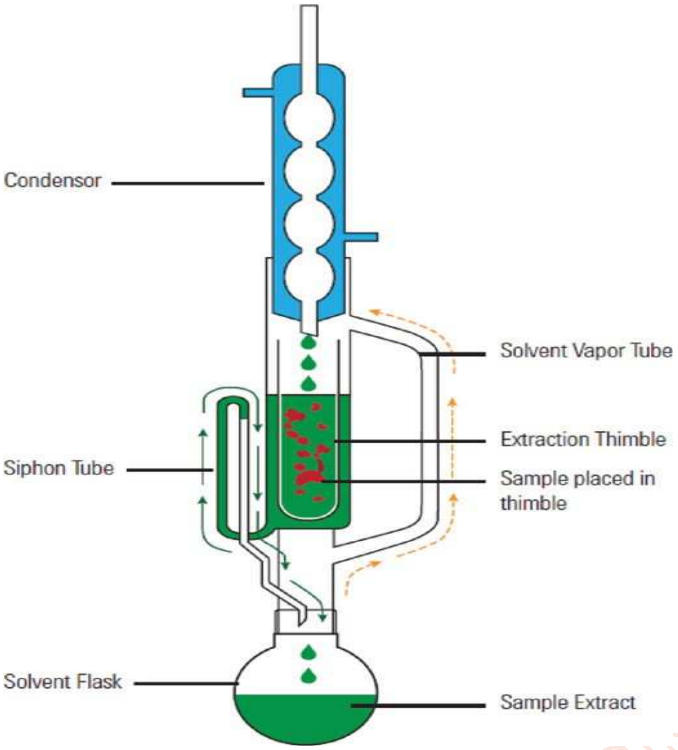


Fig. 5 Soxhlet apparatus

Purification of apigenin:-

For purification of apigenin 'Column chromatography' technique was carried out. A microscale glass column was used for this intention and firmly packed with silica gel (60 mesh). The parsley extract was added to 2 g of silica gel and dried in a rotary evaporator at 40°C, the so-obtained solid was then loaded onto the column on the top of the packed silica gel and finally, the column was eluted with hexane (100%). To increase the polarity, hexane, chloroform, and methanol were used as the eluting solvents at different ratios as follows:

chloroform:hexane (25:75), chloroform:hexane (50:50), chloroform:hexane (75:25), chloroform (100%) etc[25]. all the fractions were collected and dried, and then to specify the amount of apigenin in each fraction, each dried fraction was dissolved in methanol to be analyzed by UV-vis spectroscopy at the maximum wavelength of apigenin (λmax=337 nm).[28] Using a pre-developed calibration curve, the amount of apigenin in each fraction was determined and the fraction containing the highest amount of apigenin was further analyzed by HPLC for determination of product purity.[29]

Apigennin uses :

Apigenin, a flavonoid found in the leaves, is responsible for the anti-inflammatory, antiviral, and purgative effects of the herb, while myristicin and apiol are the major constituents of parsley seed oil, and both exhibit antioxidant activities.

Cautions

Pregnant women are warned against excessive consumption of parsley, since that can result in miscarriages and trigger menstrual flow. Because it can thin blood, parsley should not be consumed when taking anticoagulant drugs or prior to surgical procedures.[31]

Contraindications and safe doses of petroselinum:

Harmless and free of toxicity plants and foods are very less available in our time but few herbs are here to cure physical Condition and it's proven by different experiments and intervention method and safe does are recommended. The drawbacks of using These solvents are representing their toxicity and therefore cannot be added to foods. Thus, the use of non-toxic solvents and solvent mixtures such as vegetable oils or micro emulsions could be beneficial to soluble the plant extracts and also for adding to foods. Petroselinum crispum safe doses are recommended as 2gm/Kg bw/day.[38,39,40]

Conclusion:

Parsely has been in used in Ayurveda from many decades ago as because of its pharmacological activities. The information presented above conclude that the parsely is an chemicaly active drug. The various chemical constituents in Parsely show various pharmacological activities such as antibacterial, antifungal, analgesic, diuretic, hypotensive, gastroprotective, immunosuppressant, antioxidant, hepatoprotective, anti-diabetic. In India Parsely is an ayurvedic medicine used to treat asthma, coughs, eye complaints, jaundice, gout, oedema, bladder infections menstrual problems and plague.

Result and Discussion:

As we all know that parsely is an important constitution of 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 parsely is an chemicaly active drug use in the treatment of various disorders. In these reviews the extraction of the Apigenin form parsely.

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