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Akanksha Dubey, Amber Hasan and Archana Dwivedi

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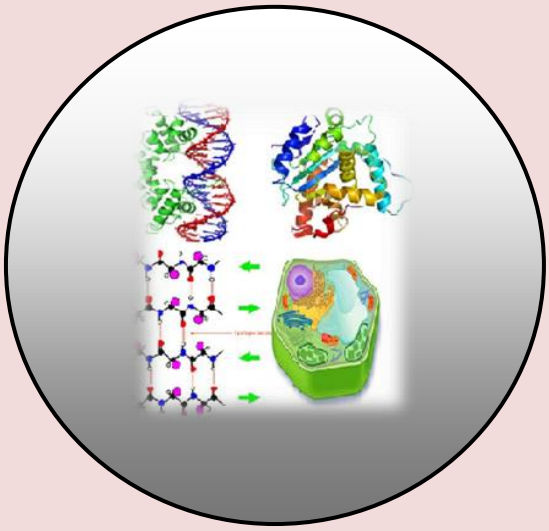

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Akanksha Dubey Amber Hasan
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REVIEW ARTICLE

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Important Phytoconstituents of Parsley (*Petroselinum crispum*)

Akanksha Dubey, *Amber Hasan and Archana Dwivedi
Department of Botany, University of Lucknow, Lucknow, U.P., India
***Department of Botany, Shia P.G. College, Lucknow, U.P., India**

ABSTRACT

Petroselinum crispum **(Parsley) is an herbal plant which belongs to Apiaceae family indigenous to Europe and western Asia.** ***Petroselinum crispum*** **is having therapeutic potential as well as used for additives, garnishing, condiment, flavoring agents and perfume.** ***Petroselinum crispum*** **is also used in cosmetics industries mainly China, Mexico, South America, India and South-East Asia. In India it got cultivated in J & K, U.K. and Punjab. Its main constituents subsume coumarins, furanocoumarins (bergapten, imperatori), ascorbic acid, carotenoids, flavonoids, apiole, various terpenoic compounds, phenyl propanoids, phathalides, and tocopherol. Due to these constituents, it has been annunciated to possess a number of possible medicinal emblematics including, anti-microbial, anti-anemic, menorrhagic, anti-coagulant, anti-hyperlipidemic, anti-hepatotoxic, antihypertensive, diuretic effects, hypoglycemic, hypouricemic, anti-oxidative and estrogenic activities. In Morocco, Parsley is mostly used as an elixir to treat arterial hypertension, diabetes, cardiac and renal diseases. Antioxidant and antibacterial activities of parsley, made it propitious in food systems. The perseverance of this review paper is to divulge the chemical constituents of parsley that are explicitly related to substantial medicinal facets.**

Keywords: Menorrhagic, Furanocoumarins, Diuretic effects, Hypoglycemic and Terpenoic compounds.

INTRODUCTION

Parsley or garden parsley (*Petroselinum crispum*) is a species of flowering plant in the family Apiaceae that is native to the central and eastern Mediterranean region (Sardinia, Lebanon,

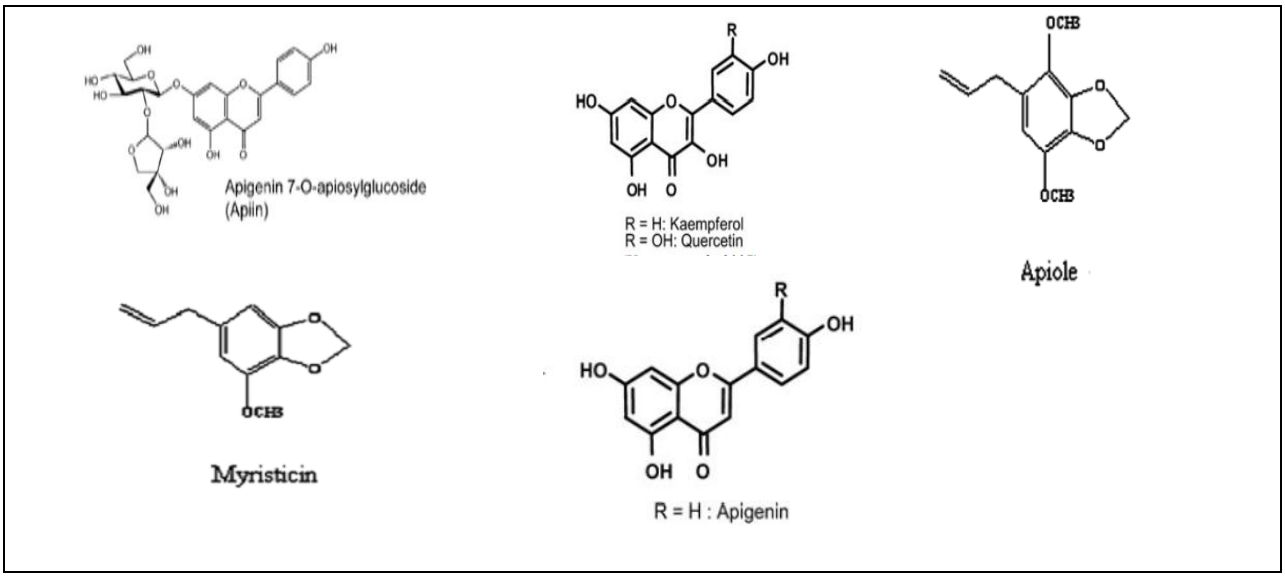
Israel, Cyprus, Turkey, southern Italy, Greece, Portugal, Spain, Malta, Morocco, Algeria, and Tunisia), but has been naturalized elsewhere in Europe, and is widely cultivated as an herb, and a vegetable. There are three common varieties of parsley, the curly leaf variety (*P. crispum* var. crispum) that is often used as a garnish, the flat leaf or Italian variety (*P. crispum* var. neapolitanum) used in tabbouleh and other Mediterranean dishes, and root parsley (*P. crispum* var. tuberosum), which is grown as a root vegetable [Craft and Setzer, 2017, Agyare et al., 2017, Chauhan and Aishwarya, 2018]. In addition to its culinary uses, parsley has also been used as a medicinal herb. Diuretic (used for bladder disorders, painful urination, retention of excess fluid in the tissues), antispasmodic, uterine tonic, emmenagogue, sedative (used for PMS and menopausal hot flushes, also in prostatitis), carminative, expectorant, aperient, antiseptic, anti-inflammatory. For flushing out the efferent urinary tract in disorders of the same and in prevention and treatment of kidney gravel. Contraindicated in kidney inflammations. Internal use of the herb for flatulent dyspepsia, dysuria and rheumatic conditions has been prescribed. The leaves and roots contain furo- coumarins—psoralen, 5-and 8-meth- oxy psoralen, imperatorin, oxypeuce- danin, iso-pimpinelin. Myristicin has been isolated from the leaf oil. The plant gave flavonoids—apiin, luteolin, apigenin-7-glucoside, luteolin-7-glu- coside among others [Figure 1, Zambrana et al., 2020, Mahmood et al., 2014, Charly Masanetz and Werner Grosch (1998].

Figure 1. Parsley plant and leaves.

CHEMICAL CONSTITUENTS

The parsley is found to have the following chemical constituents viz ascorbic acid, carotenoids, flavonoids, coumarins, apiole, various terpenoic compounds, phenyl propanoids, phathalides, furanocoumarins (bergapten, imperatori) and tocopherol have been chemically scouted. It has been reported that volatile compounds in unmarked parsley and in groups dried out, by means of the diverse drying techniques are following: α-Pinene ﹤-Myrcene, α-Phellandrene, ﹤-

Phellandrene, cis-Ocimene, Isopropenyl-4-methylbenzene, α-Terpinolene, p-Mentha-1,3,8-triene, α-Copaene, Caryophylene, ＜Farnesen, ＜-Selinene, Ⅎ-Cadinene, Myristici, ＜-Bisabolene, ＜-Sesquiphellandrene. The volatile oil of parsley seeds contains glycoside called apiin (apigenin-7-Oapiosyl-(1->2)-O-glucoside). [6-8]Cardinal oil constituents in dried parsley have been enunciated. These are as follows: α-Thujene, α-Pinene, Sabinene, ＜-Pinene, ＜ -Myrcene, α-Phellandrene, pCymene, Limonene, ＜-Phellandrene, (E)-＜-Ocimene, Ⅎ Terpinene, α -p- Dimethyl-phencone, p -cymenene, Phencone, Terpinolene, p-1,3,8-Menthatriene, Linalool, (Z) p-menth-2-en-1-ol, Dill ether, (Z) Dihydrocarvone, (E) Dihydrocarvone, (E) Carveol, α-Terpineol, Estragol, Carvone, Bornyl acetate, (E,E) Decadienal, αCopaene, 2,5-Dimethyl-p-cymene, 2,5-Dimethoxy-p cymene, (E) ＜-Caryophyllene, ＜-Ionone, (Z) Anethole, Epi-bicyclosesquiphellandrene, Germacrene αBergaptene, Myristicin, α-Cadinol, ＜-Selinene, αMuurolene, Elemicin, Germacrene, δ-Cadinol, Apiole, Phthalide isomer (vokk et al., 2011). However, the most important oil components are p-mentha-1,3,8-triene, myristicin, apiole, ＜-phellandrene, myrcene, and isopropenyl-4- methylbenzene. Odorants of parsley leaves have been enumerated and mainly comprised of p-Mentha- 1,3,8-triene, Myrcene, 2-Isopropyl-3-methoxypyrazine, 2-sec-Butyl-3-methoxypyrazine, Myristicin, Oct-1-en-3-one, (Z)-Octa-1,5-dien3-one, Linalol, (E,E)-Deca-2,4-dienal, (Z)-Dec- 6 - enal, Methanethiol, (Z)-Hex-3-enal, pMethylacetophenone, (Z)-Hex-3- enyl acetate, (Z) Hex3- enol, b-Phellandrene, 1-Isopropenyl-4-methylbenzene. Parsley aroma is substantially due to the domination of constituents viz. p-mentha-1, 3,8-triene and myristicin in relationship with supplementary constituents already at extremely stumpy concentrations, specifically, 2-secbutyl-3-methoxy-pyrazine, linalool, (Z) 6-decenal, and (Z) 3- hexenal. *Petroselinum crispum* emodies ample amounts of the flavone apigenin and the low concentration of other flavonoids [Chaves et al., 2011, Díaz-Maroto et al., 2002, Hui Zhang et al., 2007].



Pharmaceutical and Other Benefits

Traditionally, roots of *P. crispum* has been used as a powerful diuretic, seeds have been used as antimicrobial, antiseptic, antispasmodic, and in the treatment of gastrointestinal disorders, inflammation, halitosis, kidney stones, and amenorrhea. Leaves of *P. crispum* have been employed in the treatment of hemorrhoids, gastrointestinal disorders, diuretic, and as a food-flavoring agent in addition to its common usage as vegetable [Hui Zhang et al., 2006, MacLeod et al., 1985, Manderfeld, et al., 19979].

P. crispum has been found to possess many pharmacological effects including, anti-oxidant, anti-bacterial, anti-fungal, hepato-protective, anti-diabetic, analgesic, spasmolytic, immunosuppressant and gastro-protective properties. Hence this section reviews the phytochemical constituents and pharmacological activities of *P. crispum*. The leaf, seed, and root are used to make medicine. Some people use parsley for conditions such as bladder infections (UTIs), kidney stones (nephrolithiasis), gastrointestinal (GI) disorders, constipation, skin conditions, and many others. But there is no good scientific evidence to support these uses.

Figure 2. Parsley Oil.

Parsley is regarded as an aromatic, culinary herb that garnishes and flavors a great variety of dishes. In foods and beverages, parsley is widely used as garnish, condiment, food, and flavoring. In manufacturing, parsley seed oil is used as a fragrance in soaps, cosmetics, and perfumes.

However, few studies with conflicting results have been conducted on the antimicrobial activity of parsley essential oil. In addition, there have been no reports of essential oil obtained from parsley aerial parts, except seeds, as an alternative natural antimicrobial agent [Figure 2, Vokk et al., 2011, Linde et al., 2015].

CONCLUSION

Parsley contains flavonoids, coumarins, tocopherol, myristin, essential oils and many phenolic compounds. Carotenoids, vitamin A, B, C and minerals viz. Fe, Zn, Ca, P are also present in its leaves. Furocoumarins such as psoralen, bergpten, isoimperatorin, pxypeucedanin, xanthoxin, trioxalen and angelicin are the key substances of parsley. N-3 omega fatty acids like linolenic and palmitic acid are also occur in parsley. It helps remove moderately sized kidney stones and gallstones, stimulates bowel, treats deafness and ear infections, the sexual system, and stimulates adrenals. Parsley tea or juice strengthens teeth, fights gum and mouth infections, makes a face lotion, and settles stomach after a meal. Tea also used to treat urinary infections, luid retention, congestion from flu and colds, lessen asthma attacks, kidney and liver obstructions, anemia, antiseptic, lowers blood pressure, antitumor, liver stimulant, treats hypoglycemia, diuretic, good fiber laxative, encourages milk production for nursing mothers. Parsley exhibits antimicrobial, anti-anemic, menorrhagic, anti-coagulant, anti-hyperlipidemic, anti-hepatotoxic, antihypertensive ramifications, hypoglycemic, anti-oxidative, estrogenic and hyperuricemic activity of parsley has been promulgated. It is also used to cure arterial hypertension; diabetes, renal diseases and cardiovascular diseases in different countries. Due to its medicinal paramount and use in food industry, perfume manufacturing, soaps and creams its cultivation should be elevated to meet its rising demand in the entire world.

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Corresponding author: Amber Hasan, Assistant Professor, Department of Botany, Shia P.G. College, Lucknow, U.P., India
Email: hasan_abidi1982@yahoo.co.in