

A REVIEW ON PHARMACOLOGICAL ACTIVITIES OF *PETROSELINUM CRISPUM*

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ABSTRACT

Petroselinum crispum (Mill.) Nym. ex A.W. Hill which belongs to the family Apiaceae is a bright green plant, which is cultivated widely in the tropic, subtropic, and temperate regions. It is a biennial plant which is widely cultivated as an annual plant. 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. *P. crispum* has been found to possess many pharmacological effects including, antioxidant, antibacterial, antifungal, hepatoprotective, antidiabetic, analgesic, spasmolytic, immunosuppressant, and gastroprotective properties. Hence this section reviews the phytochemical constituents and pharmacological activities of *petroselinum crispum*.

Key Words: *Petroselinum crispum*, Anti-Oxidant, Anti-Inflammatory, Anti-diabetic, Immunomodulatory.

INTRODUCTION

Petroselinum crispum (Parsley) is an herbal plant which belongs to Apiaceae family originally to Europe and western Asia. *Petroselinum crispum* is having therapeutic prospective as well as used as 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 Jammu and Kashmir, Punjab, Uttrakhand, Uttar Pradesh, Maharashtra and Karnataka states. In Britain, they prefer the curly leaves forms for culinary purposes and on the continent plain leaves varieties are preferred for garnishes and flavoring. *Petroselinum crispum* plant fresh and dry leaves are rich source of phytochemical and anti-oxidant activity as well as its essential oils also holds important consign. Many studies have been carried out which confirm that it contains flavonoids, carotenoids, luteolin, apigenin, ascorbic acid, to co phenol and apiol are the main essential compounds. Fresh leaves of *Petroselinum crispum* helps in reducing oxidative stress in humans. It grows biennial, in the first year; it forms a rosette of tripinnate leaves 10-25cm

leaflets and taproot used as a food store over winter. In second year it grows a flowering stem to 75cm tall with sparser leaves and flat topped 3-10cm diameter umbels with number of yellowish green flowers. *Petroselinum crispum* seeds are ovoid 2-3mm long with prominent style remnants at the apex.

Family: Apiaceae

Synonyms: *Apium petroselinum* L., *Petroselinum hortense* Hoffm. and *Petroselinum sativum* Hoffm.

DISTRIBUTION

Petroselinum crispum most likely originated in the Western Mediterranean Region. It occurs naturally in most Mediterranean and many temperate countries. It is an old crop, which was already well-known in classical Greece and Rome. It is now widely grown in many tropical areas including East and West Africa and also in India¹. *P. crispum* is widely grown for its leaves in most Mediterranean countries, Europe and North America. In the tropics, including South East Asia, it is cultivated on a small scale. Varieties with thickened, edible taproot are of

recent origin and probably developed around 1500 AD in Northern Germany. In India it has been cultivated in Jammu and Kashmir, Punjab, Uttrakhand, Uttar Pradesh, Maharashtra and Karnataka states.² Their cultivation is concentrated in North-Western and Eastern Europe and among North Americans. Parsley is widely distributed in Turkey, and grown in gardens and fields.³

PLANT DISCRPTION

Petroselinum crispum is a bright green, annual herb in subtropical and tropical areas. In temperate climates, it grows as a biennial, where in the first year; it forms a rosette of tripinnate leaves with numerous leaflets and a taproot used as a food store over the winter. In the second year, it grows as a flowering plant with sparser leaves and flat-topped diameter umbels with numerous yellow to yellowish-green flowers.⁴

It is an erect copiously branched, herb that can grow up to 30 to 100 cm tall, aromatic in all parts and smooth. The stem is cylindrical, grooved and hollow. The leaves are arranged alternately, 1-3-pinnately compound, dark green, glossy, flat or curled and with sheath at the base. The petiole is longest in the lower leaves. The pinnae are long-stalked, with obovate-cuneate to finely linear leaflets, which are divided into acute segments. The higher leaves are gradually less divided while the topmost leaf consists of a few acute segments only.

The inflorescence is a terminal or axillary compound umbel. The 1-3 foliolate bracts are rather short. There are 3 to 15 secondary rays (pedicels) which are 2 to 5 mm long.

FLOWERS: The flowers are small, yellow-green and bisexual. The sepal is obscure. The petal consists of 5 petals which are sub-orbicular to obovate, measuring up to 1 mm x 0.5 mm and sub-marginate with an inflexed apical lobe. There are 5 stamens. The pistil is with an inferior and 2-carpelled ovary where each carpel is with a thickened stylopodium, a style and a spherical stigma.

FRUIT: The fruit is a schizocarp, measuring 2 to 3 mm long, ovoid and it splits into 2 mericarps when ripen with each having 5 narrow ribs.

ROOTS: The root system is slender, fibrous with taproot measures up to 1 m long, sometimes

thickened and with a radical rosette of leaves when young⁵.

SEEDS: The seeds are ovoid, 2 to 3 mm long, with prominent style remnants at the apex. The plant normally dies after seed maturation⁶.

CHEMICAL CONSTITUENTS

Phytochemically, the leaves and seeds of *P. crispum* has been shown to contain high levels of essential oil known as apiole, while the tender buds contain psoralen and related compounds that can induce photosensitivity and these include xanthotoxin, fucosin, bergapten, majudin, heraclin and antimicrobial furocoumarins namely 8-methoxypsoralen, 5-methoxypsoralen, oxypuecedanin, isopimpinellin, 6'-acetylopin and a new monoterpene glycoside. The seed also contains cafiolene, beta-phelandrene, myrcene, fat and myristicin. Furthermore, the plant is a good source of iron, calcium, phosphorous, flavonoids and antioxidants like luteolin, vitamin C, vitamin A and zinc.⁷



Petroselinum crispum

PHARMACOLOGICAL ACTION

1. ANTIOXIDANT ACTIVITY & ANTIBACTERIAL ACTIVITY:

In the recent investigation carried out it was indicated that phenolic compounds of *Petroselinum Crispum* obtained from essential oil was found to be responsible for its antibacterial and antioxidant activity.⁸

2. ANTI-INFLAMMATORY & HEPATOPROTECTIVE PROPERTY:

The phytochemical screening of the ethanolic extract of *Peroselinum Crispum* revealed that the presence of flavonoids, tannins, sterols and or triterpenes. The extract exhibited significant

protection against carrageenan-induced inflammation, cotton pellet-induced granuloma and CCl₄-induced hepatic damage.⁹

3. IMMUNOMODULATING ACTIVITY:

Immunomodulating activity of Essential oil obtained from *Petroselinum crispum* seed which suppresses humoral and cellular immune response by inhibiting splenocytes and macrophages function.¹⁰

4. GASTROINTESTINAL ACTIVITY:

Ethanol extract from *Petroselinum crispum* leaves executed beneficial effects on different models of peptic ulcer in rats via its anti-secretory and cytoprotective activity¹¹. Aqueous extract from *Petroselinum hortense* seeds demonstrated laxative activity in rat by significant absorption of sodium and water and also enhancing Na⁺-KCl₂ transporter activity in the colon¹².

5. ANTIMICROBIAL AND CYTOTOXIC ACTIVITY:

Petroselinum crispum leaves hold antibacterial activity on *Bacillus subtilis* and *Escherichia coli*. Hot and cold water extract of *Petroselinum crispum* leaves demonstrated antibacterial activity against *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *Staphylococcus pyogenes* bacteria. Ethanol extract of *Petroselinum crispum* leaves inhibited the growth of *Lactobacillus plantarum* and *Leuconostoc mesenteroides*. The furocoumarins isolated extract from *Petroselinum crispum* leaves found to possess inhibitory activity against *Escherichia coli*, *Listeria monocytogenes*, *Erwinia carotovora* and *Listeria innocua*. Psoralen, 8-methoxypsoralen, 5-methoxypsoralen, oxypeucedanin and isopimpinellin were among the responsible components antimicrobial furocoumarins.¹³

6. ANTI-DIABETIC ACTIVITY

Diabetic rats which were treated with parsley extract which was found to significantly lower the counts of blood glucose, alanine transaminase and alkaline phosphatase. The studies confirm that parsley demonstrates a significant hepatoprotective effect in diabetic rats¹⁴

7. CARDIOVASCULAR ACTIVITY

Petroselinum crispum leaves decreases blood pressure which recorded from the carotid artery in anaesthetized rats. This effect was attenuated with muscarinic receptor antagonist. It also

decreased rate and amplitude of contraction on isolated rat atria which weakened by muscarinic antagonist. These data indicate hypotensive and negative inotropic and chronotropic activity of *Petroselinum crispum*. Leaves demonstrated strong antiplatelet aggregation effect. Aglycone flavonoids; keampferol, apigenin and cosmoisin are responsible compounds for this activity.¹⁵

8. GENITOURINARY ACTIVITY

Petroselinum crispum oil (0.6 mL/kg body weight.) showed protective activity against zearalenone-induced reproductive toxicity and improved testosterone levels in matured male mice. The extract obtained from *Petroselinum crispum* seeds (5 mg/kg) reduces the dysfunction in rats kidney caused by prostaglandin-induced abortion through immunohistochemical and immune-fluorescent staining and biochemical analysis¹⁶.

CONCLUSION

In the present review, Author has tried to describe active constituent, pharmacological activity of *Petroselinum crispum*. It has several pharmacological activities such as Antibacterial and Antioxidant, Anti-inflammatory and Hepatoprotective, Immunomodulating, Gastrointestinal, Antimicrobial and Cytotoxic, Cardiovascular and Genitourinary Activity in *in vitro*, *in vivo* and *ex vivo* models. Several patents have been secured on *Petroselinum crispum*, which is either used alone or in combination with other pharmacologically active agents. It can be concluded that *Petroselinum crispum* is a useful and important medicinal plant with wide range of proven medicinal activity.

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