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REVIEW

Critique of medicinal conspicuousness of *Parsley (Petroselinum crispum*): A culinary herb of Mediterranean region

Sidra Mahmood[1], Shahzad Hussain*[2] and Farnaz Malik[2]
[1]Department of Bioinformatics and Biotechnology, International Islamic University, Islamabad, Pakistan
[2]Drugs Control and Traditional Medicines Division, National Institute of Health, Islamabad, Pakistan

Abstract: WHO estimates, around 80% of the especially developing world is indigent on complementary and alternative medicines which are prodigiously derived from herbal material. Parsley (*Petroselinum crispum*) is an important culinary herb originated from the Mediterranean region. It possesses small and dark seeds with volatile oil content. *Petroselinum crispum* is now planted throughout the world due to its usage in food industry, perfume manufacturing, soaps, and creams. 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, antimicrobial, antianemic, menorrhagic, anticoagulant, antihyperlipidemic, antihepatotoxic, antihypertensive, diuretic effects, hypoglycaemic, 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. Its ELI17 gene has been corroborated as a particularly fast-responding gene. There is a requisite for extensive research to avail the maximal benefits of this significant medicinal plant. The aim of this review paper is to divulge the chemical constituents of parsley that are explicitly related to substantial medicinal facets.

Keywords *Petroselinum crispum,* hypoglycaemic, aggregation, apigenin.

INTRODUCTION

Interest in the herbs has been escalating day by day, as they might offer a natural armor against the augmentation of certain maladies and be a conjectural treatment for some diseases. Parsley (*Petroselinum crispum*) is an important culinary herb commenced from the banks of Mediterranean basin, where it still can be found in wild forms. Parsley belongs to the genus Petroselinum Hill of the Apiaceae ancestors with the intention of being manipulated in the foodstuff, pharmaceutical, perfume and cosmetic productions (Lopez *et al*., 1999). In Turkey, it is extensively disjected and sprouted inside gardens and fields. New, dehydrated, and dried out foliage are utilized as a condiment, embellish and flavoring ingredient (Petropoulos *et al*., 2004). Parsley (*Petroselinum crispum*) possesses small and dark seeds with volatile oil content (Tahan and Bayram, 2011). The indispensable oil of parsley has been reported to be immoderately manipulated in the victuals production and still as a cologne in perfume manufacturing, soaps, and creams nevertheless the oil for such functions is garnered from the seeds for the reason that the leaves yield minor amount. Parsley is propagated in the United States once a year, for its scented and beautiful foliage (Simon and Quinn, 1988). Three major categories of parsley have been studied: 1) Unadorned leaf category (ssp neapolitanum, Danert), 2) Twisted leaf form (ssp crispum), primarily grown intended for their plants, 3) turnip- deep-rooted or 'Hamburg' category (ssp. tuberosum), which is cultivated designed for its pedigree (Petropoulos *et al*., 2004). For the reason that of the soaring water substance (75-80%), parsley is customarily dehydrated for make known, in order to impede germs escalation and prevent deprivation due to biochemical feedback (Diaz *et al*., 2002). It has been noted that aeration procedure of parsley foliage from *Petroselinum crispum* L. can sway the sensual and scented attributes of this herbal artifact. HPLC analysis actuated the 6"-O-malonylapiin to apiin fraction to be a appropriate indicator method. This fraction is altitudinous for unmarked and lyophilised foliage substance; oven-ventilation leads to demalonylation and consequently, to a squatty malonylapiin-apiin fraction (Lechtenberg *et al*., 2007). Parsley plants and cell cultures are well recognized systems for studying non-host plant/pathogen interactions, indubitably with view to the titivation of phenyl propanoid metabolism (Hahlbrock and Scheel, 1989). The wastewater irrigation in parsley production fruitages socioeconomic benefits, but it also has negative effects on plant and musters heavy metal accumulation (Keser and Buyuk, 2012).

*Corresponding author: e-mail: shshaikh2001@yahoo.com

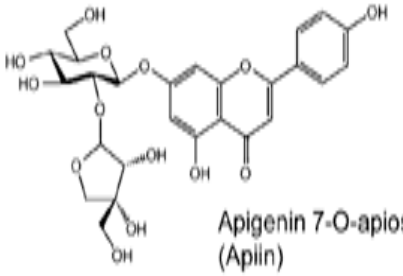
Chemical constituents

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 (Tunali *et al*., 1999). 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 β-Myrcene, α-Phellandrene, β-Phellandrene, cis-Ocimene, Isopropenyl-4-methylbenzene, α-Terpinolene, p-Mentha-1,3,8-triene, α-Copaene, Caryophylene, β-Farnesen, β-Selinene, γ-Cadinene, Myristici, β-Bisabolene, β-Sesquiphellandrene. The volatile oil of parsley seeds contain glycoside called apiin (apigenin-7-O-apiosyl-(1->2)-O-glucoside) (Tahan and Bayram, 2011).

Parsley (Damien *et al*., 2011)

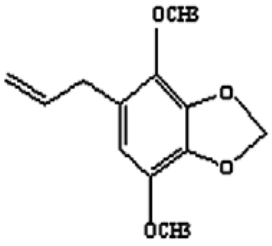
Seed capsules of *Petroselinum crispum* (aphotoflora.com)

Flowers of *Petroselinum crispum* (blogspot.com)



(Gregory *et al.*, 2012)

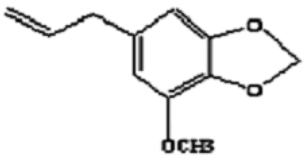
Cardinal oil constituents in dried parsley have been enunciated. These are as follows: α-Thujene, α-Pinene, Sabinene, β-Pinene, β -Myrcene, α-Phellandrene, p-Cymene, Limonene, β-Phellandrene, (E)-β-Ocimene, γ-Terpinene, α -p- Dimethyl-phencone, p -cymenene, Phencone, Terpinolene, p-1,3,8-Menthatriene, 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, α-Copaene, 2,5-Dimethyl-p-cymene, 2,5-Dimethoxy-p-cymene, (E) β-Caryophyllene, β-Ionone, (Z) Anethole, Epi-bicyclosesquiphellandrene, Germacrene α-Bergaptene, Myristicin, α-Cadinol, β-Selinene, α-Muurolene, 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, β-phellandrene, myrcene, and isopropenyl-4- methylbenzene (Kasting *et al*., 1972; Vernon and Richard 1983; MacLeod *et al*., 1985).



Apiole

(Hui Zhang *et al*., 2006)

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-methoxy-pyrazine, Myristicin, Oct-1-en-3-one, (Z)-Octa-1,5-dien-3-one, Linalol, (E,E)-Deca-2,4-dienal , (Z)-Dec- 6 -enal, Methanethiol, (Z)-Hex-3-enal, p-Methylacetophenone, (Z)-Hex-3- enyl acetate, (Z) Hex-3- enol, b-Phellandrene, 1-Isopropenyl-4-methylbenzene (Charly and Werner, 1998). Parsley aroma is substantially due to the domination of constituents viz. p-mentha-1, 3,8-triene and myristicin (Jung *et al*., 1992) in relationship with supplementary constituents already at extremely stumpy concentrations, specifically, 2-sec-butyl-3-methoxy-pyrazine, linalool, (Z) 6-decenal, and (Z) 3- hexenal (Masanetz and Grosch, 1998).

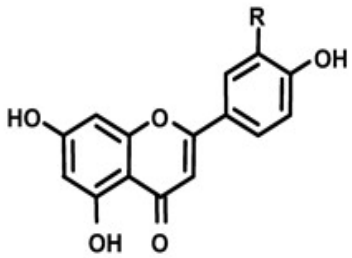


Myristicin

(Hui Zhang *et al*., 2006)

Petroselinum crispum emodies ample amounts of the flavone apigenin (Justesen *et al*., 1998) and the low concentration of other flavonoids. Flavones are a class of flavonoids discerned in a variety of fruits and vegetables and are most lavish in kumquats, parsley, and celery (Azzini *et al*., 2007; Sakakibara *et al*., 2003). Apigenin is a flavone espied in vegetables, seasonings (Ku¨ hnau,

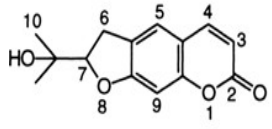
1976) and oranges (Fernandez de Simon *et al*., 1992), and it heralds antioxidant activity in vitro (Fraga *et al*., 1987; Van Acker *et al*., 1996). Its potent biological effects have been elucidated in vitro and *in vivo*. Apigenin is imbibed from parsley, and exuded in low amounts, 0·58% on average, with urine. The parsley intervention resulted in sententious augmentation in the two antioxidant enzymes, GR (glutathione reductase) and SOD (superoxide dismutase) (Nielsen *et al*,. 1999).



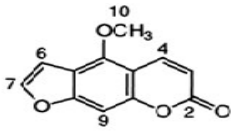
R = H : Apigenin
(Gregory *et al.,* 2012)

HPLC scrutiny of methanol extracts commencing elicitor-treated parsley cells , their manifestation through spectroscopic methods (MS, NMR) brandish two indication furanocoumarins marmesin and bergapten along with four structurally related phthalides 5-hydroxy-3-butylidenephthalide, 7-hydroxy-3-butylidenephthalide, 7-hydroxy -3- butylidenephthalide7 -O-glucoside and 7-hydroxy-3-butylidenephthalide-7-O (6-malonylglucoside). Furanocoumarins are the foremost dispersible components contemplated to be powerful phytoalexins (Scheel *et al*., 1986; Matern, 1991).

Furanocoumarins

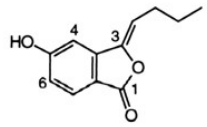


Marmesin

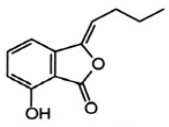


Bergapten

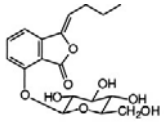
Butyldenephtalides



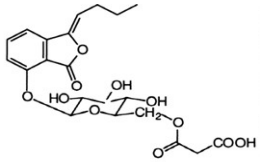
5-hydroxybutylidene-phthalide



7-Hydroxybutylidene-phthalide



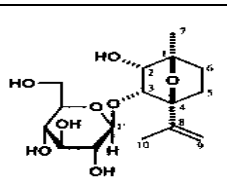
7-Hydroxybutylidenephthalide 7-*O*-glucoside



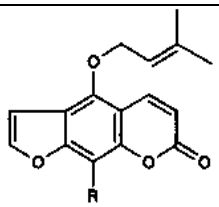
7-Hydroxybutylidenephthalide 7-*O*-(6'-malonylglucoside)

(Jens *et al.,* 1999)

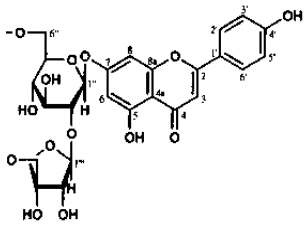
Through bioassay-guided separation, two benzooxoles, myristicin and apiole (Yakushijin *et al.,* 1983), two furocoumarins, cnidilin (Kuo-Hsiung *et al.,* 1969) and isoimperatorin, (Kuo-Hsiung *et al.,* 1969) and four flavone glycosides, apigetrin, (Redaelli *et al*., 1980) apiin (Markham *et al.,*1978) diosmetin 7-O-b-D-glucopyranoside and kaempferol 3-O-b-D-glucopyranoside (Okuyama *et al* .,1978) together with a new glycoside, 6"-acetylapiin have been sequestered from American dried *parsley.* From Japanese fresh *parsley,* a new monoterpene glucoside called petroside has been quarantined together with apiin and icariside F_2.



Petroside



Cnidiilin:R=OMe



6"-acetylapiin

(Masayuki *et al.,* 2000)

Pharmacological significance

Concerning 80% of the globe's populace is dependent on the exercise of conventional medication, which is commodiously supported on plant material (Dahiru *et al*., 2006). Studies on a numeral of medicinal plants connote to facilitate propitious phytochemicals which know how to be mellowed for numerous fitness troubles (Gupta, 1994). In recent years, herbal medications encompass procured significance for the reason that of their standardization, effectiveness and charge value. These drugs are invariably single plant extracts or fractions thereof or mixtures of fractions and extracts from diverse plants (Subramoniam and Pushpangadan, 1991). Petroselinum crispum is now cultivated throughout the world and has been wielded in folk medicine as a diuretic, a stomachic, an emmenagogue and an abortifacient (Kreydiyyeh *et al*., 2001).

Parsley has been promulgated to possess a number of possible medicinal idiosyncrasies including; antimicrobial (Wong and Kitts, 2006), antianemic, menorrhagic (Baytop, 1984), anticoagulant, antihyperlipidemic, antihepatotoxic, antihypertensive effects (Ozturk *et al*., 1991), antioxidant (Nielsen *et al*., 1999) as well as

laxative (Kreydiyyeh *et al*., 2001). It has been bestowed to medicament lumbago, eczema, knee, ache, impotence, nose bleed and as a blood pressure regulator (Manderfeld *et al*., 1997).

The seeds of parsley are also evinced like a diuretic owing to its elevated essential oil substance (Marczal *et al*., 1997; Darias *et al*., 2001). Parsley has a diuretic effect due to its constituent's apiol and myristicin (Newall *et al*., 1994; Tyler, 1996; Kreydiyyeh and Usta, 2002) and because diuretics exaggerate the flow of urine, this is efficacious for the body to wash out bacteria as well as stones. Parsley accommodates calcium, iron, carotenes, ascorbic acid, and vitamin A (Louis, 1991). Because ascorbic acid is intimately renewed to oxalate, and furthermore emerge to augment the assimilation of nutritional oxalate, complementation may sprout the hazard of kidney pebbles (Massey *et al*., 2005). Parsley leaf tea has no significant change on urine constitution or risk of urinary area rock creation in healthy subjects as well as there is a prerequisite for further research to reckon the consequences of parsley folio tea on urinary factors in fit and stone-developing patients (Fahad and Danny, 2011).

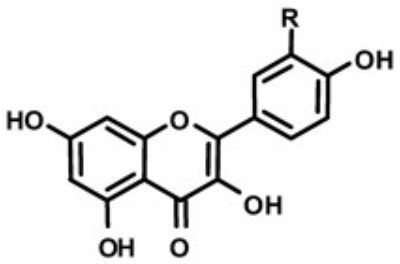
Hypoglycaemic activity of parsley has been unveiled by Ozsoy *et al*., (2006). Its itemized antidiabetic functions may perhaps due to terpenoids (Pino *et al*., 1997), flavonoid glucosides, coumarins (Anand *et al*., 1981) otherwise ascorbic acid (Davey *et al*., 1996). As an immemorial drug for diabetes, plant has been utilized in Turkey and in the whole world (Noel *et al*., 1997). In folk medicine, it has been utilized to manipulate a commodious assortment of stipulations (Yanardag *et al*., 2003a; Yanardag *et al*., 2003a). It has also been conjectured, that parsley has antimicrobial activity and concentrate of parsley parade a noteworthy shielding outcome on the liver damage of diabetic rats (Bolkent *et al*., 2004; Manderfeld *et al*., 1997). Antioxidant capacity has been symbolicly aggrandized by subsidiary of the regime by means of unsullied parsley leaf can in rat plasma (Hempel *et al*., 1999) and diminish oxidative hassle in humans (Nielsen *et al*., 1999). Treatment of D-galactose-stressed mice with the ethanolic extract of P. crispum showed bulwark against the induced oxidative stress in brain regions. Therefore, it has been enunciated that parsley manifests a protective effect against mitochondrial oxidative damage in the mouse brain (Vora *et al*., 2009). Actually, parsley contains voluminous hunk of flavonoids (apiin, luteolin, apigenin- glycosides), ascorbic acid, tocopherol and indispensable oils (apiole, myristicin) with anti-oxidant activities and these might preclude oxidative harm (Marczal *et al*., 1997; Nielsen *et al*., 1999; Fejes *et al*., 2000).

Apigenin has been imputed to be endowed with anti-carcinogenic (Wei *et al*. 1989; Birt *et al*. 1997), anti-inflammatory (Lee *et al*., 1993) and anti-mutagenic dominions (Kuo *et al*., 1992). *In vitro* studies flaunt that the flavone apigenin of parsley restrains human lung, colon, breast, prostate, brain, and skin cancer cells; (Manthey *et al*., 2002; Engelmann *et al*., 2002) tongue cancer; (Walle *et al*., 2007) and leukemia (Vargo *et al*., 2006). Apigenin also abridge monocyte adhesion to LDL in vitro, showing potential to thwart one of the initial stages of atherosclerosis (Jeong *et al*., 2007). In addition, animal studies with flavones substantiate the ability to alleviate the inflammatory response (Ueda *et al*., 2004; Nicholas *et al*., 2007).

It has been implied so as to parsley indispensable oil might be capable to restrain the cellular and humoral invulnerable retort. It knows how to decimate, evenly NO making as well as the purposes of macrophages as the central instinctive immune cells. Allergy, autoimmune along with chronic inflammatory disorders has been traditionally cured by parsley (Alireza *et al*., 2012).

Intestinal disorders are ameliorated by parsley in the traditional herbal medicine. Parsley seed extract has inhibitory effect on ileum contraction and it was probably due to blocking of voltage- gated calcium channels (Moazedi *et al*., 2007). It has been consummated that the aqueous and ethanol extracts of parsley endeavor antispasmodic activity on rat ileum. The relaxant effect of ethanolic extract was found better as compared to aqueous extract of parsley (Branković *et al*., 2010) and non-selective antagonists of adrenoceptors (phentolamine and propranolol) do not stymie relaxation induced by extract. This justifies its use in folk medicine as a remedy for intestinal cramps and diarrhea (Irzaie *et al*., 2010).

Parsley (Petroselinum crispum) and its major flavonol constituents Kaempferol and Quercetin are proficient of abating the uric acid levels in hyperuricemic. Therefore, the use of suboptimal dosages of allopurinol in combination with parsley intake may provide a snug avenue for prevention and treatment of hyperuricemia (Seid *et al*., 2011).



R = H: Kaempferol
R = OH: Quercetin
(Yvonne *et al*., 2007)

Phenylketonuria (PKU) is an autosomal dormant genetic illness delineating through peculiarly lofty stages of phenylalanine in the transmission, along with the

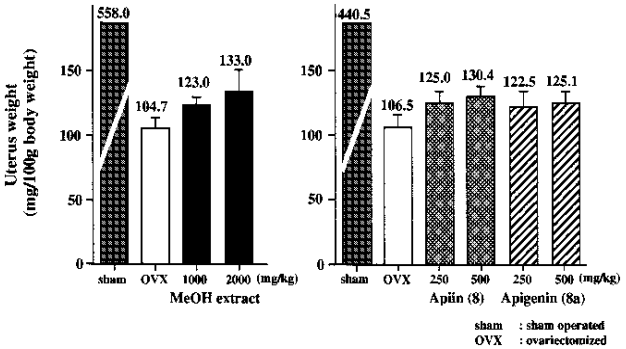
nonappearance or noticeably curtailed enzymic properties of phenylalanine hydroxylase (PAH) in the liver (Folling, 1994; Jervis, 1960). It is induced by imperfections in the phenylalanine hydroxylase (PAH) genetic material (Folling, 1994). It has been used as an effectual therapeutic enzyme for the conduct of PKU (Ambrus *et al*., 1978). It switches phenylalanine to harmless t-cinnamic acid (Hoskins *et al*., 1984). The predicaments of this alluring enzyme treatment encompasses the little steadiness in the passage and the antigenicity of the plant enzyme. Recombinant PAL instigated from parsley (Petroselinum crispum) chemically conjugated with stimulated PEG2 [2, 4-bis (O-methoxypolyethy-leneglycol)-6-chloro-s-triazine] have been shown enormously augmented equanimity in the spread and abridges the plasma concentration of phenylalanine in mice. Therefore, PEG-PAL may be optimized for the protected acceptance stimulation by each element or genetic amendment of PAL, and can be bequeathed carefully to PKU patients devoid of the threat of destructive allergic reactions (Ikeda *et al*., 2005).

In Morocco, parsley is frequently used to treat arterial hypertension (Ziyyat *et al*., 1997; Eddouks *et al*., 2002), diabetes, cardiac (Jouad *et al*., 2001; Eddouks *et al*., 2002) and renal diseases (Jouad *et al*., 2001). Polyphenolic compounds, α tocopherol and flavonoids of parsley could intercept platelet functions, activation and aggregation (Janssen *et al*., 1998; Mabile *et al*., 1999; Rein *et al*., 2000; Pearson *et al*., 2002;) furthermore fortress adjacent to cardiovascular maladies (Pace-Asciak *et al*., 1995). Aqueous extract (Pc) of Petroselinum crispum (Mill), apigenin and cosmosiin possesss a strong anti- platelet aggregation activity that interfere on haemostasis (Chaves *et al*., 2011) causing an addendum of tail bleeding time and normalizing the platelet hyper-aggregability connected to cardiovascular disorders (Dounia *et al*., 2009). Parsley also hindered *in vitro* thrombin and ADP-persuaded platelet gathering (Mekhfi *et al*., 2004).

Insufficiency of internal estrogen (estrone, estradiol) secretion engenders several physical snarls shown in postmenopausal women, such as osteoporosis, blood cholesterol elevation, and symptoms of menopause (hot flashes and depression) (Masayuki *et al*., 2000). The extracts of the aerial part of Petroselinum crispum MILL. (Parsley) that was cultivated in U.S.A. and Japan evinced reproducible estrogenic activity comparable to that of the isoflavone glucoside fraction (Kitagawa *et al*., 1976) from soybean.

Food eminence upgrading

Parsley (Petroselinum crispum), is frequently employed to flavor the foods of China, Mexico, South America, India and South East Asia. Food quality deterioration majorly occurs due to lipid oxidation. Constituents of unsullied parsley folio exploration superoxide anion in vitro (Campanella *et al*., 2003) along with methanol concentrates of parsley scavenge hydroxyl fundamental in totaling to bulwarking in opposition to ascorbic acid-persuaded membrane oxidation (Fejes *et al*., 2000). Phenolic composites hauled out from parsley have been found accountable, in fraction, for mutually antioxidant and antibacterial properties (Peter and David, 2006). The antioxidant activity of parsley in food systems is related to its total phenolic content and radical scavenging capacity but not to their propensity to chelate iron in vitro (Jimenez *et al*., 2008).



Effects of Methanolic Extracts of *Parsley, Apiin and Apigenin* on uterus weight. It decreases in Ovariecto-mized Mice. Each column represents mean with the S.E. of 5 to 7 mice. (Masayuki *et al.*, 2000)

Parsley grown in summer time, could assist in mummifying foods because of colossal content of compounds with antimicrobial activity and a tenacious impeding effect of essential oils although different nutrient content of food may imprint microbial resistance (Díaz *et al*., 2002). It has been noted for its antibacterial action in opposition to normal microflora, coliforms, yeast and molds and S.aureus in Kareish cheese, and its totaling is pertinent to the purchaser and might legacy to the improvement of novel and protected multifariousness of Kareish cheese (Wahba *et al*., 2010).

Additional remarkable features

Parsley (Petroselinum crispum) ELI17 gene has been ascribed as a predominantly quick-responding gene emanating a new-fangled category of W box-containing, elicitor-responsive advertiser constituent, E17. The protein instructed by the ELI17 gene, demonstrates a variety of fundamental features of established transcription factors and is designated as a CMPG protein according to the first four strictly conserved amino acids, delineating a recently promising category of plant specific proteins (Christoph *et al*., 2001). Phe ammonia-lyase (PAL) is an enzyme, which has been derived from parsley (Petroselinum crispum). For the reason that, its chief responsibility in secondary phenylpropanoid metabolism, it is solitary the main irregularly investigated plant enzymes (Holger and Georg, 2004). PAL actuate the impulsive, non-reductive amination of

Table 1: Imputing the discernible bioactive constituents along with their medicinal importance isolated from *Petroselinum crispum.*

Chemical constituents	Medicinal importance	References
Phenolic Compounds	Antioxidant and antibacterial activities	Peter and David, 2006.
Apiol and Myristicin	Diuretic effect	Tyler, 1996; Newall *et al.,* 1994; Kreydiyyeh and Usta, 2002.
Essential Oil Content	Diuretic effect	Darias *et al.,* 2001; Marczal *et al.,* 1997
Ascorbic acid	sprout the risk of kidney stones	Massey *et al.,* 2005.
Terpenoids Flavonoid Glucosides Coumarins Ascorbic acid	Anti-diabetic properties	Anand *et al.,* 1981; Davey *et al*., 1996
Flavonoids (apiin, luteolin, apigenin-glycosides), ascorbic acid, tocopherol and essential oils (apiole, myristicin)	Antioxidant properties	Nielsen *et al.,* 1999; Fejes *et al*., 2000; Marczal *et al.,* 1997.
Flavone apigenin	Restrains human lung, colon, breast, prostate, brain, and skin cancer cells, tongue cancer, Leukemia, initial stages of atherosclerosis.	Manthey *et al.,* 2002; Engelmann *et al*., 2002; Walle *et al.,* 2007; Vargo *et al*., 2006; Jeong *et al*., 2007.
Parsley essential oil	Suppress the cellular and humoral immune response, allergy, autoimmune and chronic inflammatory disorders	Alireza *et al.,* 2012.
Kaempferol and Quercetin	Treatment of hyperuricemia	Seid *et al.*, 2011.
α tocopherol and flavonoids	Intercept platelet functions, activation and aggregation, Cardiovascular diseases	Mabile *et al.,* 1999; Janssen *et al.,* 1998 and Pearson *et al.,* 2002; Rein *et al.,* 2000; Pace-Asciak *et al.,* 1995.
Apigenin and cosmosiin	Strong antiplatelet aggregation activity	Chaves *et al*., 2011.

trans-cinnamic acid to L-phenylalanine in the charisma of elevated ammonia congregations. By means of this asymmetric production, theoretical capitulates of 100% can be acquired; it is an enthralling response for manufacturing procedures (Sebastian and Uwe, 2010). Parsley seed oil has been found to endorses maximum inhibitory action in the direction of malonaldehyde (MA) configuration from squalene upon UV-irradiation (Wei and Shibamoto, 2007). Parsley sects distinguish the fungal Phytophthora sojae, a phytopathogen through a plasma covering receptor. This parsley receptor binds to a 13 amino acid oligopeptide portion (Pep-13) of a 42 k Da fungal cell barrier glycoprotein and instigates a multifaceted resistance comeback in cultured parsley cells (Dirk *et al*., 1998).

CONCLUSION

Parsley exhibits antimicrobial, antianemic, menorrhagic, anticoagulant, antihyperlipidemic, antihepatotoxic, 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 paramountcy 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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