

QUANTIFICATION OF PHENOLICS AND FLAVONOIDS FROM *PETROSELINUM CRISPUM* EXTRACTS

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ABSTRACT. Parsley (*Petroselinum crispum* L.) is a very popular spice and vegetable, it is known to be diuretic, smooth muscle relaxant and hepatoprotective. It is rich source of antioxidants such phenolics and flavonoids. In this study were studied spectrophotometric determination of polyphenols and flavonoids content from chloroform, ethanolic and methanolic extracts of parsley. Quantitative determination of polyphenols and flavonoids was determined using catechol and quercetin as standard. The result show high content of polyphenols and flavonoids in ethanolic extracts, which suggests that the extracts have antioxidant activity.

KEYWORDS: flavonoids, phenolics, quercetin, *Petroselinum, crispum*

INTRODUCTION

Poliphenols, the aromatic compound in plant kingdom occurring in all parts of the plants and they offer resistance to diseases. Their effect to reduce risk of cancer. Higher the phenolics content stronger is the antioxidant activity. (Maxwell, 1995)

Natural antioxidants such as dietary plant flavonoids have an increasing number of reports that directly contradict the putative role of flavonoids as antioxidants and anti-cancer agents. (Pourmorad et al, 2006)

Antioxidants are compounds that protect cells against the damaging effects of reactive oxygen species, such as singlet oxygen, superoxide, peroxy radicals, hydroxyl radicals and peroxynitrite. An imbalance between antioxidants and reactive oxygen species results in oxidative stress, leading to cellular damage. Oxidative stress has been linked to cancer, aging, atherosclerosis, ischemic injury, inflammation and neurodegenerative diseases (Parkinson's and Alzheimer's). Flavonoids may help provide protection against these diseases by contributing, along with antioxidant vitamins and enzymes, to the total antioxidant defense system of the human body. Epidemiological studies have shown that flavonoid intake is inversely related to mortality from coronary heart disease and to the incidence of heart attacks.

The capacity of flavonoids to act as antioxidants depends upon their molecular structure. The position of hydroxyl groups and other features in the chemical structure of flavonoids are important for their antioxidant and free radical scavenging activities. Quercetin, the most abundant dietary flavonol, is a potent antioxidant

because it has all the right structural features for free radical scavenging activity.

Parsley or garden parsley (*Petroselinum crispum*) which belongs to genus *Petroselinum* of family Apiaceae, is a species native to the central Mediterranean region, naturalized elsewhere in Europe and widely cultivated as an herb, a spice and a vegetable. (Bown D., 2005)

Parsley (*Petroselinum crispum* L.) is a very popular spice and vegetable in Europe. Its herb are known to be diuretic, smooth muscle relaxant and hepatoprotective. The most important identified active ingredients are flavonoids, coumarins and vitamin C. Luteolin and its glycosides are the main flavonoids in parsley, it can be found in relatively large amounts in the leaves. The flavonoid has anti-inflammatory, antioxidant and anticancer activities. (Papay Z., 2012)

The volatile oil contains a large number of chemicals including flavonoid which is beneficial in treating allergy. It also has apiole compound that seem to act as an antiseptic in the urinary tract and stimulate uterine muscles. Although it is not commonly eaten in quantity, parsley herb is a good natural source of carotene (provitamin A), vitamins B1, B2, and C, as well as iron and other minerals. (Papay Z., 2012)



Fig.2. *Petroselinum crispum* (leaves)

The fresh leaves (Fig.1) are highly nutritious and can be considered a natural vitamin and mineral supplement in their own right. Both plants act by encouraging the flushing out of waste products from the inflamed joints and the waste's subsequent elimination via the kidneys. Parsley root is more commonly prescribed than the seeds or leaves in herbal medicine.

Parsley root is taken as a treatment for flatulence, cystitis, and rheumatic conditions. Parsley is also valued as a promoter of menstruation, being helpful both in stimulating a delayed period and in relieving menstrual pain. Parsley volatile oil with its contained apiol and myristicin is toxic, and so, not recommended for pregnant women.

Flavonoids are phenolic compounds isolated from a wide variety of plants, and are valuable for their multiple properties, including antioxidant and antimicrobial activities.

From parsley extracts were identified flavonoids : quercetin, luteolin, kaemferol (M. Stan, et al, 2011) and apigenin (Pápay Z.E, et al, 2012)(fig.2.)

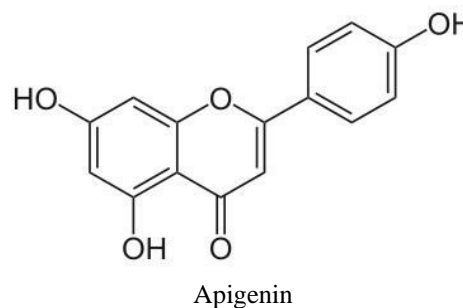
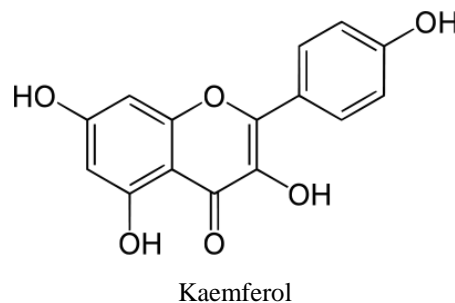
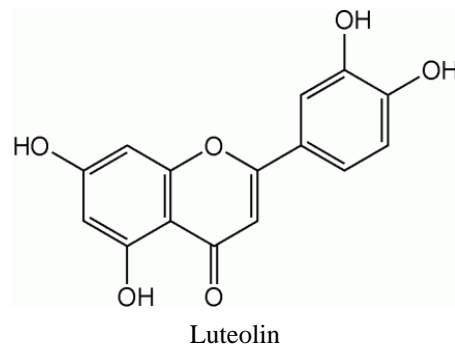
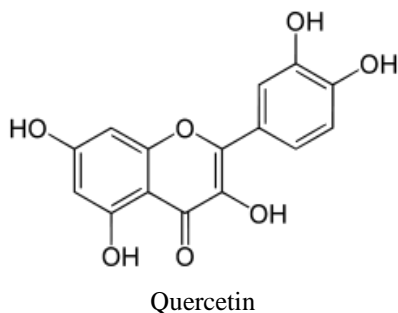


Fig.2. Flavonoids compounds from *Petroselinum crispum* L.

In the present work, parsley (*Petroselinum crispum* L.) extracts were obtained by extraction with chloroform, ethanol and methanol. Quantitative determination of polyphenols and flavonoids was determined spectrophotometrically using catechol and quercetin as standards.

MATERIALS AND METHODS

Materials.

Finely powdered air shade-dried leaves were taken for experiments. Catechol, quercetin, kaemferol, luteolin and all other chemicals used were from Merck.

The UV spectrophotometer (UV-VIS Schomadzu) was used for the measurement of absorbance at various concentrations of the extracts under study.

Preparation of extracts.

Leaves of *Petroselinum crispum* were collected from adult plants in the morning, then plant material was dried at room temperature. The dried and finely ground samples of parsley leaves (1g) were extracted with solvents by maceration (48 h). The solvents removed under vacuum at temperature below 50°C. The each extract was prepared just before the experiment so as to prevent any further degradation.

The polyphenols determination (FR X, 1993)

Poliphenols react with fofowolframic acid in alkaline medium and produced blue coloured. The absorbance measured at 660 nm is represented. A standard curve using different concentration of catechol drawn from which the concentration of poliphenols in the test samples was calculated and expressed as mg polyphenols/g material.

Total flavonoids determination: (Chang et al.2002)

Aluminium chloride colorimetric method was used for flavonoids determination. Each plant extracts (0.5 mL of 1 : 10 g/mL) in methanol were separately mixed with 1.5 mL of methanol, 0.1 mL of 10 % aluminium chloride, 0.1 mL of 1 M potassium acetate and 2.8 mL of distilled water. It was kept at room temperature for 30 min.; the absorbance of the reaction mixture was measured at 415 nm. The calibration curve was obtained by preparing quercetin solutions at concentrations 3.5 to 100 mg/mL.

RESULTS AND DISCUSSION

The present study has verified that remedial plants could be good source of antioxidant substances. It has been acknowledged that flavonoids show significant antioxidants action on human health and fitness. The mechanism of action of flavonoids are through scavenging or chelating process (Kessler et al., 2003)

The content of poliphenolics that measured in terms of catechol equivalent (standard curve equation: $y = 0.117x + 0.015$, $r^2 = 0.998$) were between 15,20 to 54,20 mg/. (table1)

The content of total flavonoid that were measured by aluminium chloride colorimetric technique in term of quercetin equivalent (the standard curve equation: $y = 0.014x + 0.012$, $r^2 = 0.997$) were between 4.50 to 42.1 mg/g.(table 1)

Table 1.

Poliphenols and flavonoids contents in the leaves extracts

<i>Extracts</i>	<i>Poliplhenols (mg/g)</i>	<i>Flavonoids (mg/g)</i>
Chloroform	15.20	4.50
Ethanol	54.20	42.10
Methanol	35.60	25.12

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CONCLUSIONS

The ethanol extract of leaves show higher poliphenolic and flavonoid content than chloroform and methanol extracts.

Hence bioactive antioxidant components can be isolated by further separation of ethanol extract. The high scavenging property of *Petroselinum* may be due to hydroxyl groups existing in the phenolic compounds chemical structure that can provide the necessary component as a radical scavenger. The results indicate that the plant material may become an important source of compounds with health protective potential.

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