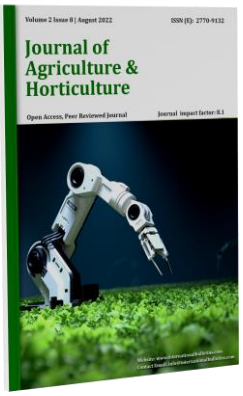

THE ANALYSIS OF THE COMPONENT OF GREEK WALNUT LEAF IN THE CONDITION OF KARAKALPAKSTAN

Gulxan Genjemuratova
PhD on Chemistry, Karakalpak State University RUz, Nukus
Kudiyarova Aygul
PhD on Chemistry, Karakalpak State University RUz, Nukus
Safarboeva Nargiza
Student, Karakalpak State University RUz, Nukus
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Abstract. Greek walnut leaves (Juglans regia) are known for their medicinal properties and have been used for centuries in traditional medicine. The leaves contain a variety of active compounds, including tannins, flavonoids, phenolic acids, and juglone, which contribute to their health benefits. As a result, the article presents the investigation of the analysis of the components of Greek walnut leaves in the condition of Karakalpakstan.

Keywords: plant, walnut, leaf, Greek walnut, components, elements, benefits, medicine.

Juglans regia is a large deciduous tree, attaining heights of 25–35 metres (80–120 feet), and a trunk up to 2 m (6 ft) in diameter, commonly with a short trunk and broad crown. The bark is smooth, olive-brown when young and silvery-grey on older branches, and features scattered broad fissures with a rougher texture [4]. Like all walnuts, the pith of the twigs contains air spaces; this chambered pith is brownish in color. The leaves are alternately arranged, 25–40 cm (10 to 16 in) long, odd-pinnate with 5–9 leaflets, paired alternately with one terminal leaflet. The largest leaflets are the three at the apex, 10–18 cm (4 to 7 in) long and 6–8 cm (2 to 3 in) broad; the basal pair of leaflets are much smaller, 5–8 cm (2 to 3 in) long, with the margins of the leaflets entire [6, 171-173]. The male flowers are in drooping catkins 5–10 cm (2 to 4 in) long, and the female flowers are terminal, in clusters of two to five, ripening in the autumn into a fruit with a green, semi fleshy husk and a brown, corrugated nut. The whole fruit, including the husk, falls in autumn; the seed is rage, with a relatively thin shell, and edible, with a rich flavor [1, 77-83].

Greek walnut leaves contain a variety of chemical elements, including potassium, calcium, magnesium, phosphorus, and sulfur. They also contain trace amounts of iron, zinc, copper, and manganese. These elements play important roles in various bodily functions such as muscle and nerve function, bone health, and immune system function. Additionally, the active compounds in walnut leaves such as tannins, flavonoids, phenolic acids, and juglone are also chemical elements that contribute to their health benefits [5].

1. Potassium: Greek walnut leaves are a rich source of potassium, an essential mineral that plays a vital role in regulating fluid balance, muscle and nerve function, and blood pressure. Potassium also helps to maintain healthy heart function and is important for bone health.

2. Calcium: Calcium is an essential mineral that is crucial for strong bones and teeth. Greek walnut leaves contain a significant amount of calcium, which makes them a valuable dietary source of this mineral.
3. Magnesium: Magnesium is another essential mineral that is important for maintaining healthy bones, muscle and nerve function, and cardiovascular health. Greek walnut leaves are a good source of magnesium, which helps to regulate blood pressure and promote relaxation.
4. Phosphorus: Phosphorus is an important mineral that is essential for the growth and repair of tissues and cells in the body. It also plays a key role in maintaining healthy bones and teeth. Greek walnut leaves contain phosphorus, which contributes to their overall nutritional value.
5. Sulfur: Sulfur is a chemical element that is important for the formation of proteins and connective tissues in the body. It also plays a role in maintaining healthy skin, hair, and nails. Greek walnut leaves contain sulfur, which makes them a valuable dietary source of this element [2,21].
6. Iron: Iron is an essential mineral that is necessary for the production of red blood cells and the transport of oxygen throughout the body. Greek walnut leaves contain trace amounts of iron, which contributes to their overall nutritional value.
7. Zinc: Zinc is an important mineral that is essential for immune system function, wound healing, and DNA synthesis. Greek walnut leaves contain trace amounts of zinc, which makes them a valuable dietary source of this mineral.
8. Copper: Copper is an essential mineral that plays a role in the formation of red blood cells, connective tissues, and bone health. Greek walnut leaves contain trace amounts of copper, which contributes to their overall nutritional value.
9. Manganese: Manganese is an important mineral that is essential for bone health, wound healing, and metabolism. Greek walnut leaves contain trace amounts of manganese, which makes them a valuable dietary source of this element.
10. Flavonoids: Greek walnut leaves contain flavonoids, which are plant compounds that have antioxidant and anti-inflammatory properties. Flavonoids may help to protect against chronic diseases such as heart disease, cancer, and diabetes.
11. Tannins: Tannins are plant compounds that have astringent properties and may help to reduce inflammation and protect against certain types of cancer. Greek walnut leaves contain tannins, which contribute to their overall health benefits.
12. Vitamins: Greek walnut leaves contain vitamins such as vitamin C and vitamin E, which are important for immune system function and skin health. They also contain vitamin K, which is essential for blood clotting and bone health.
13. Essential oils: Greek walnut leaves contain essential oils, which are aromatic compounds that have therapeutic properties. These oils may help to reduce stress, improve mood, and promote relaxation [3,223-230].

14. Fiber: Greek walnut leaves contain fiber, which is important for digestive health and may help to reduce the risk of certain chronic diseases such as heart disease and diabetes.
15. Protein: Greek walnut leaves contain protein, which is important for muscle growth and repair. They also contain amino acids, which are essential for the formation of proteins in the body.

Overall, the combination of these active compounds makes Greek walnut leaves a potent natural remedy with a wide range of health benefits. Some of the potential uses of walnut leaf extract include:

- Treating skin conditions such as eczema, psoriasis, and acne
- Reducing inflammation and pain
- Boosting the immune system
- Fighting off infections
- Promoting wound healing
- Supporting liver function
- Lowering blood sugar levels
- Reducing the risk of chronic diseases such as heart disease and cancer.

The following table illustrates the components of Greek walnut leaves cultivated in the condition of Karakalpakstan:

Component	Result	Stat. Err.	LLD	LLQ	Element line	Intensity(cps/μA)
AL_2O_3	8,03%	0.142	0.290	0.689	L:AL-Kα	0.44060
SIO_2	13.0%	0.0749	0.0768	0.230	L:SI-Kα	2.577960
P_2O_5	3.47%	0.0287	0.0519	0.156	L:P-Kα	1.85944
SO_3	4.17%	0.0179	0.0239	0.0717	L:S-Kα	6.06696
Cl	20.0%	0.0190	0.0070	0.0211	L:CL-Kα	118.72558
K_2O	9.50%	0.0896	0.0969	0.291	L:K-Kα	0.63735
CaO	38.4%	0.116	0.0848	0.254	L:Ca-Kα	2.99934
TiO_2	0.244%	0.0171	0.0409	0.123	L:Ti-Kα	0.02853
MnO	0.126%	0.0041	0.0077	0.0230	M:Mn-Kα	0.07560
Fe_2O_3	2.60%	0.0120	0.0051	0.0153	M:Fe-Kα	2.28604
NiO	0.0167 mass%	0.0009	0.0020	0.0060	M:Ni-Kα	0.03801
CuO	0.0209 mass%	0.0007	0.0014	0.0041	M:Cu-Kα	0.07047
ZnO	0.0442 mass%	0.0007	0.0009	0.0028	M:Zn-Kα	0.21913
As_2O_3	0.0032 mass%	0.0002	0.0004	0.0013	M:As-Kα	0.03687
Br	0.0113 mass%	0.0002	0.0002	0.0007	M:Br-Kα	0.26257
Rb_2O	0.0036 mass%	0.0001	0.0003	0.0009	M:Rb-Kα	0.10788
SrO	0.301 mass%	0.0007	0.0003	0.0010	M:Sr-Kα	9.53339
ZrO_2	0.0251 mass%	0.0007	0.0005	0.0014	H:Zr-Kα	0.09791

It is clear from the table that Greek walnut leaves are rich in chemical components. The highest amount in the result belongs to the component CaO which is 38%, while the least amount is As_2O_3 which is 0.0032%.

In conclusion, Greek walnut leaves contain a variety of active compounds that contribute to their health benefits. These include tannins, flavonoids, phenolic acids, and juglone, which have antioxidant, anti-inflammatory, antibacterial, antifungal, and antiviral properties. As such, walnut leaf extract may be a useful natural remedy for a wide range of health conditions.

References:

1.Аслонова И.Ж., Кароматов И.Д., Тураева Н.И. Химический состав грецкого ореха // Биология и интегративная медицина. 2019. № 10 (38). С. 77–83

2.Еникеева Р.А. Исследование по фармакогностическому изучению и стандартизации сырья и препаратов орех грецкого (Juglans regia L.): автореф. дис. … канд. фарм. наук. М., 2008. 21 с

3.Литвиненко А.А., Мыкоц Л.П., Жилина О.М., Степанова Н.Н. Изучение адсорбционных свойств природных сорбентов, полученных из ореха грецкого (Juglans Regia l.). В сборнике: Беликовские чтения. Материалы VIII Всероссийской научно-практической конференции. Пятигорск: Пятигорский медико-фармацевтический институт – филиал ФГБОУ ВО ВолгГМУ Минздрава России, 2020. С. 223–230

4.Ничепуренко В.В., Красина И.Б. ИСПОЛЬЗОВАНИЕ ЛИСТЬЕВ ГРЕЦКОГО ОРЕХА ДЛЯ ПРОИЗВОДСТВА КОНДИТЕРСКИХ ИЗДЕЛИЙ // Современные наукоемкие технологии. – 2004. – № 2. – С. 159-159; URL: https://top-technologies.ru/ru/article/view?id=21718 (дата обращения: 10.06.2023).

5.Сквиря Максим Алексеевич. Разработка технологии помадных конфет с использованием листьев грецкого ореха : диссертация ... кандидата технических наук : 05.18.01 / Сквиря Максим Алексеевич; [Место защиты: Кубан. гос. технол. ун-т].- Краснодар, 2008.- 179 с.: ил. РГБ ОД, 61 09-5/744

6.Суслова, А. В. Использование листьев грецкого ореха при производстве функциональных продуктов питания / А. В. Суслова. — Текст : непосредственный // Молодой ученый. — 2011. — № 4 (27). — Т. 2. — С. 171-173. — URL: https://moluch.ru/archive/27/2798/ (дата обращения: 10.06.2023).