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Corresponding Email:
dr.syedrizwan@kiu.edu.pk

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Importance and strength of walnut (*Juglans regia*) as a medicinal plant: A Review

Syed Rizwan Abbas and Faryal khan

Department of Biological Sciences; Hunza Campus, Karakorum International University.

Abstract

Natural medicines have a great value as compared to synthetic ones and these natural medicines can be obtained from natural medicinal plants. Walnut is one of the most widely distributed Plant with several medicinal properties. *Walnut* is a plant which has a good medicinal strength for to treat many diseases like diarrhea, stomach pain, arthritis, asthma, skin disorders, and some endocrine diseases like diabetes mellitus, thyroid dysfunctions, cancer and some other diseases. There is great importance of all the parts of walnut plant. The article is written to give a detailed knowledge on the, medicinal use, nutritional composition, and other purposes. Nowadays, there is a great importance of walnut, and its use as a traditional medicine and a scientific research at extraction and identification of active components from natural extracts. The use of walnut as a traditional medicine demonstrated that walnut contains multiple, important and essential compounds which are essential to overcome or treat several diseases in patients.

Keywords: Ethnobotanical use; Nutritional value; Active components; Traditional medicine; Essential compounds.

Introduction

God has gifted us many plants which have a great value as a medicine to cure different diseases. The plant is generally known as the Persian walnut, white walnut, English walnut or common walnut. It is a large, deciduous tree, reaching a height up to 25-35 m and exceptionally a maximum trunk diameter up to 2 m. It is long-lived: normally 100-200 years, but some specimens may reach 1000 years old. It belongs to juglandaceae and the botanical/scientific name for walnut is *Juglans regia*. At present, it is cultivated at commercial level in different countries of the world .World production of whole walnut was around 1.5 × 106 t in 2008 (FAO, 2008). China is the leading world producer, followed by the USA, Iran, Turkey, Ukraine, Romania, France and India. Leaves of walnut plant contain different compounds to treat or overcome different types of diseases. There are many important chemical constituents in walnut which are medicinally important for the treatment of many diseases like cancer, high cholesterol

level, skin infections and many other serious diseases. In some cases, walnuts are used as anti-diarrhea and anti-parasitic drug, as well as it purifies blood. Walnut is the more important and beneficial plant as a food and medicine. It has also many edible uses due to which this plant is now popular in whole world.

Description

Walnut is a large tree which can grow up to 25 to 30 m and the trunk of walnut tree attains height of 2m. Walnut tree requires light and full sun to grow better. The bark of walnut tree is smooth and brown in color. There are air spaces in the pith and this pith is brown in color. The leaves of walnut tree are alternate to each other. Both male and female parts are present in walnut tree. Walnut tree has big and hard branches and they are silvery-grey in color. The seed present in the fruit of walnut is large with a thin shell and it is rich in flavor.

Habitat and ecology

Juglans regia is native to the mountain ranges of central Asia but now it extends to the different countries of world, like China, Kazakhstan, Uzbekistan, Nepal, India, Srilanka, Pakistan and many other parts of the world. Walnut tree needs some special conditions to grow, like deep and rich soil, full sun and minimum temperature should be 29°C. The kernels of walnut can be damage because of very high summer temperatures. The walnut blight infections can be increased due to rains in late spring and summer.

Cultivation and harvesting

There are different methods for the cultivation of walnut tree. It needs fertile soil and it is rooted deep in the soil. The soil should be free of alkali salts and maximum amount of boron should be present in it. The husk of walnut fruit open between September 1 and November 7 and first picking is possible after the first week of September. Nuts can be easily fall by shaking walnut tree by long poles. If nuts are dirty they should be washed and keep them in trays and should be covered and not exposed to sun for whole day because if they dry very fast then the shell of the nut should break and open.

Phytochemistry and Nutritional Composition of Walnut

Walnut is one of the medicinal plant that is used for many years due to its nutritional composition. There is a great concentration of protein and oil contents in walnut. Therefore, walnut is important for human nutrition. Walnut contains phytochemicals such as alkaloids, flavonoids, cartenoids, and other polyphenolic. The seed of the walnut (kernel) is eaten fresh. Walnuts are nutrient-rich food because of greater amount of fats, proteins, vitamins and minerals. There are many important potential neuroprotective compounds in walnut i.e. gamma tocopherol, phenolic acid, flavonoids, and the most important one is juglone. Clinical studies evoke about omega-3 PUFA that they have great contribution to treat heart disease (Davis et al., 2007). According to experimental studies or researches, it was prove that the extent value for protein was 18.1% (Amaral et al., 2003); Walnuts contains glutelins (about 70% of the total seed proteins) together with lower amounts of globulins (18%), albumins (7%) and prolamins (5%) (). Walnuts composed of high amount of potassium, phosphorus and magnesium and lower sodium. These elements have an important contribution for the activity of many enzymes especially as cofactor.

Medicinal Uses of Walnut

Walnut leaves are widely used as a medicine to treat several diseases like diarrhea, sinusitis, and cold and stomach ache. The walnut leaves are used as a medicine for the reduction of pain in joints and are also used for the lowering of fever (Yesilada, 2002). Walnut seed is also good to treat the inflammatory bowel disease (). Walnut seed is considered as a best medicine to treat many serious diseases in Palestine (Kaileh et al., 2007) and it is also good for reducing the chances of vascular disorders (Spaccarotella et al., 2008). Walnut is used for the treatment of dermal inflammation and too much sweating of the hands and feet. Walnut plant is used in ayurvedic system of medicine, and Ayurveda *Juglans regia* is used for healing wounds and is also used to treat diseases related to nervous system. The leaves of walnut tree are used for the treatment of scalp irritation and hair problems, skin damages due to excessive exposure to sunlight or other skin problems and infections. Walnut is used as a folk medicine for the treatment of cancer, asthma, diabetes, kidney disorders, liver disorders and many other diseases. There are many other health benefits present in walnuts, i.e. they can reduce the chances of cardiovascular disease, heart disease, diabetes and they can also prevent and treat certain cancers, and other neurological diseases. The paste of walnut tree bark is good to treat tooth pain, skin infections and hair problems. Walnut can lower cholesterol and is good for weight loss. Walnut can also control high blood pressure in patients and reduce depression.

Traditional uses

In different countries walnut is traditionally used for different purposes. In turkey leaves of walnut plant are applied on body and on forehead to reduce fever. Leaves are also applied on joints to overcome pain since many years. Walnut is used as a medicine for the treatment of heart diseases and diabetes in Palestine for many years. In Mexico walnut is used as a traditional medicine to treat liver disorders. In china the branches, barks and outer covering of fruit of walnut is used for the treatment liver and lung disorders. The leaves of walnut are good for the whitening of skin and they can remove dark spots and uneven pigments from skin. Traditionally walnut oil is used for making local dishes on special occasions especially in northern areas of Pakistan.

Antityrosinase Activity

The gel formulation composed of ellagic acid and the walnut tree leaves are good for the reduction of uneven skin pigmentation. The ethnolic acid present in leaves of walnut tree is also good for the whitening of skin. When the melanoma cells of the skin was treated with walnut polyphenols after the inhibition of melanin formation in skin, the results showed that the walnut polyphenol is considered more superior agent for the lightening of skin. So, walnut has a great contribution as a best agent for lightening and whitening of skin.

Anticancer Activity

Walnut has been reported as an essential food to prevent intestinal carcinogenesis induced by azoxymethane in rats and 5802 Afr. J. Microbiol. Res. it maintains the amyloid-protein in its soluble form and prevent from the attack of Alzheimer's disease and prevent the breakdown of acetylcholine. Walnut comprises of 20-25% of protein with highly essential amino acids. The enzymatic hydrolysate of Persian walnut protein has excellent antioxidant properties.

There is a protein in walnut that is known as protein hydrolysate which stops the growth of cancer cells in human colon and breast. Thus, walnut is considered as a good medicine to treat several cancer types.

Antidiabetic Activity

Diabetes mellitus is one of the main cause of death in the human society and is considered as the third in the world. However, the use of insulin is very beneficial to treat and overcome the risk of diabetes. Experimental studies have shown the properties of different medicinal plants to treat diabetes. The uses of walnut leaves are very essential for the treatment of diabetes. Walnut tree leaves have also been observed as a substance which kills parasites; and is essential to treat the diseases like tuberculosis and diabetes. The leaves of walnut are best natural medicines that are recommended for patients who are suffering from diabetes as a traditional medicine. Juglone is one of the most beneficial compound which is present in different parts of the walnut plant. Itis reported in a research that walnut bark overcomes the chances of causing diabetes. The leaves or green fruits of walnut trees are consumed as hypoglycemic agents. In some previous studies it is shown that the liquid extract of walnut leaves can lower glucose level in blood in patients who are suffering from diabetes. walnut leaves can lower the glucose level of blood in patients suffering from diabetes. (Fathi Azad *et al*., 2009) have also reported that the consumption of hydroalcoholic dose-dependent extract of walnut leaves decreases the level of blood glucose in diabetic rats. Walnut is considered as a beneficial medicinal plant for the treatment of diabetes.

Some Other Uses of Walnut

The leaves of the walnut tree are the best source of flavonoids and the anticancer properties of flavonoids is a good source to regulate the function of immune system and it can also increase in the anticancer activities in the body. The compound known as juglone present in the leaves of walnut tree have an effect on growth of colon cancer cells present in rats and it has anticancer role in preventing the formation of benign or malignant intestinal tumors. (Tanaka et al., 2007) It is shown that juglone present in walnut plant prevents the production of human sickle cells, dose-dependently. The studies have shown that the main component in walnut that is known as juglone, is linked with the insecticidal activity. Walnut is also beneficial to treat inflammatory bowel disease in organisms/humans. In a study, Mokhtari *et al*., [2016] reported that the usage of walnut leaf extract contains analgesic properties; so that the usage of walnut leaves in the acute phase of pain, can be beneficial for the reduction of pain. The administration of walnut leaf extracts, together with morphine, causes analgesia in the acute phase. Some flavonoids such as quercetin have analgesic effect through adrenergic pathways and reduce the sensitivity of the central system and eventually reduce pain. Walnut can lowers blood cholesterol level, weight and it can also lower high blood pressure.

Protective of Liver and Kidney

Walnut leaves are the good source for protection of liver from oxidative damages that are produced from carbon tetrachloride due to its hydroalcoholic extract. The effective property of walnut leaves for the protection for liver is also beneficial in meeting the changes in detoxifying and antioxidant enzymes and sweeping free radicals away. It is also shown that the use of walnut also had a great role to treat acute renal failure and could be beneficial in regeneration of nephron cells *in vivo* or *in vitro*. some of the practical studies have shown that the intraperitoneal

injection of walnut extract into rats overcomes the amount of alanine aminotransferase, aspartate aminotransferase, total protein, and plasma albumin, while there was no changes in the bilirubin levels, BUN, creatinine, and alkaline phosphatase enzyme activity.

Conclusion

Walnut is a medicinal plant which belongs to family *juglandaceae* that has been used as a traditional medicine for treatment of a lot of diseases. Studies have shown that walnuts are a good source of important nutrients that are essential for human health and it contains certain phytochemicals which can treat many serious diseases in humans as well as in animals. This paper shows the traditional as well as medicinal use of walnut. This review study also examines the dispersal, composition and effects of walnut on human health. It is also concluded that natural medicines or products like *juglans regia* are best medicines for better treatment with minimum side effects. According to the studies conducted on walnuts and their properties, the basic aim of this study was to review the dispersal of walnut, its chemical walnut composition and therapeutic properties.

References

Fao, F. A. O. S. T. A. T. (2008). Food and agriculture organisation of the United Nations. *Retrieved on*, *15*.

Davis, C., Potts, C., & Speas, M. (2007, October). The pragmatic values of evidential sentences. In *Semantics and Linguistic Theory* (Vol. 17, pp. 71-88).

Amaral, N. C. (2003). *Financiamento da educação superior: estado x mercado*. Cortez Editora.

Yeşilada, E., & Küpeli, E. (2002). Berberis crataegina DC. root exhibits potent anti-inflammatory, analgesic and febrifuge effects in mice and rats. *Journal of ethnopharmacology*, *79*(2), 237-248.

Kaileh, M., Berghe, W. V., Heyerick, A., Horion, J., Piette, J., Libert, C., ... & Haegeman, G. (2007). Withaferin A strongly elicits IκB kinase β hyperphosphorylation concomitant with potent inhibition of its kinase activity. *Journal of Biological Chemistry*, *282*(7), 4253-4264.

Spaccarotella, K. J., Kris-Etherton, P. M., Stone, W. L., Bagshaw, D. M., Fishell, V. K., West, S. G., ... & Hartman, T. J. (2008). The effect of walnut intake on factors related to prostate and vascular health in older men. *Nutrition Journal*, *7*(1), 13.

Khaki, A., FATHI, A. F., Nouri, M., Khaki, A. A., OZANCI, C. C., GHAFARI, N. M., & Hamadeh, M. (2009). The effects of Ginger on spermatogenesis and sperm parameters of rat.

Tanaka, T., & Sugie, S. (2007). Inhibition of colon carcinogenesis by dietary non-nutritive compounds. *Journal of toxicologic pathology*, *20*(4), 215-235.

Mokhtari, C., Ebel, A., Reinhardt, B., Merlin, S., Proust, S., & Roque-Afonso, A. M. (2016). Erratum for Mokhtari et al., Characterization of Samples Identified as Hepatitis C Virus Genotype 1 without Subtype by Abbott RealTime HCV Genotype II Assay Using the New Abbott HCV Genotype Plus RUO Test. *Journal of clinical microbiology*, *54*(9), 2402.