

Abandoned septum in Walnut (*Juglans regia* L.) kernel having many chemical active ingredients for mankind. A Review.

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ABSTRACT

Herbal medicines are the oldest type of health service known by humankind. Medicinal shops have been used by all societies throughout the history Walnut (*Juglans regia* L.) kernel membranes septum (or septa), a traditional nutraceutical material in China, around the world for both unique nutritive characteristics and health-related benefits kernel is extensively consumed, has not been explored in detail. the walnut septum excerpt contains colorful chemical composites. In the last many decades, scientific substantiation has stressed the significance of shops in the prevention and/or supportive treatment. lately examinations have concentrated on the walnut by- products and waste products, with exploration on their precious ingredients and active parcels. Indeed, though several studies delved the composition and natural conditioning of different corridor of the walnut septum, the internal septum of the walnut kernel is less estimated. In the last two decades, some studies delved phytochemical and pharmacological aspects of the walnut septum. Their results showed a wide range of natural parcels along with safety of walnut septum ingredients persuading us to shift our view to walnut septum as a useless by- product to a natural herbal material with precious parcels.

Keywords. Herbal, Walnut, *Juglans regia* L. Kernel, Septum

I. INTRODUCTION

Amazing advances in agricultural research have contributed to the rapid strides of agricultural

technology. Modern technology is sophisticated, precise and highly specialized rendering the task of those involved in agriculture, horticulture and animal husbandry highly challenging.

The plant has been utilized in tropical medicine to treat cutaneous irritation and excessive perspiration in the hands and feet. The leaves are traditionally used to treat sinusitis and stomach aches and are also used throughout the world as an antibacterial, anthelmintic, antidiarrheal, hypoglycemic, tonic, and depurative medicine. In Turkish traditional medicine, fresh leaves are applied to the naked body or the forehead to reduce fever or to swollen joints to treat rheumatic agony¹⁻².

Walnut (*Juglans regia* L.) Origin and distribution is the most widespread tree nut in the world. The tree is commonly called as the Persian walnut, white walnut, English walnut or common walnut. It belongs to juglandaceae family and has the scientific name *Juglans regia*. The walnut tree species is native to the old world. It is native in a region stretching from the Balkans eastward to the western Himalayan chain and was cultivated in Europe as early as 1000 BC. At present, walnut is cultivated commercially throughout southern Europe, northern Africa, eastern Asia, the USA and western South America. China is the leading world producer, followed by the USA, Iran, Turkey, Ukraine, Romania, France and India, but production in other countries such as Chile and Argentina has increased rapidly in recent years.³⁻⁴

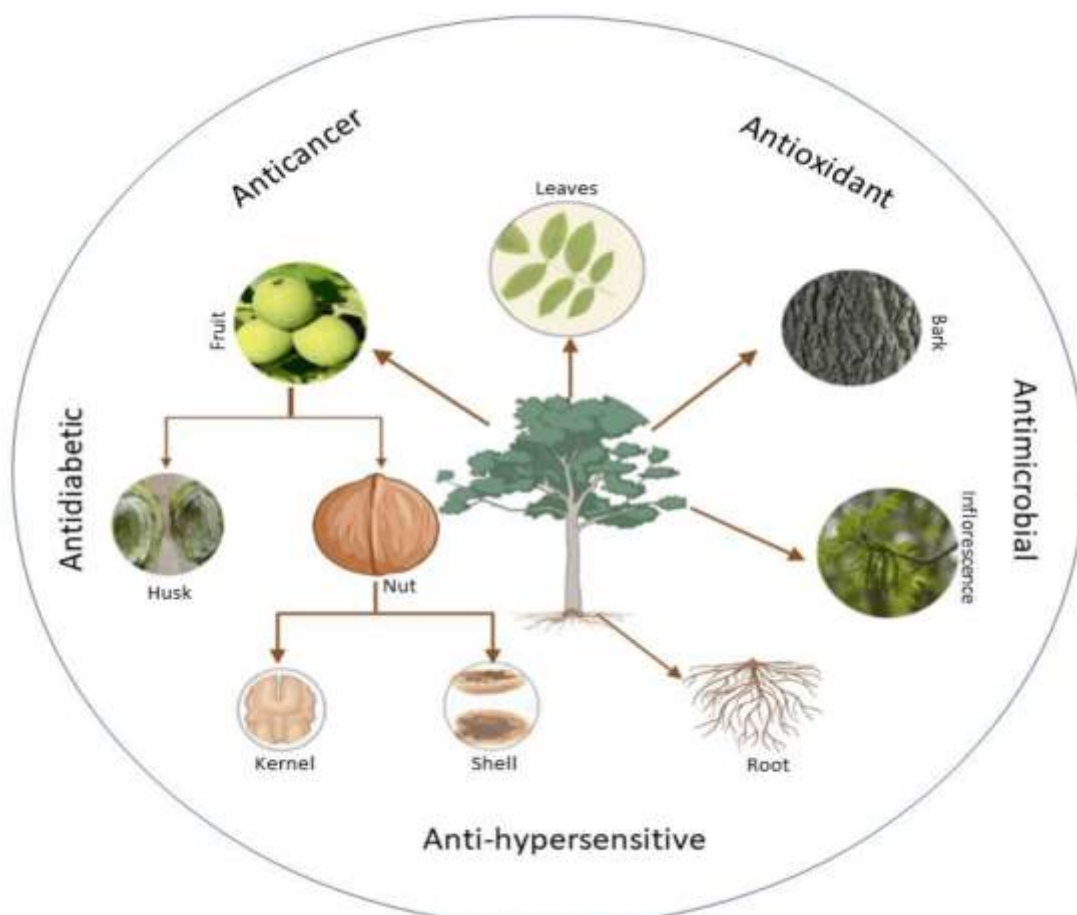


Figure No. 1. Different parts of walnut fruit (*Juglans regia*) with medicinal properties.



Figure No. 2. Different stages of walnut fruit during cultivation and collection

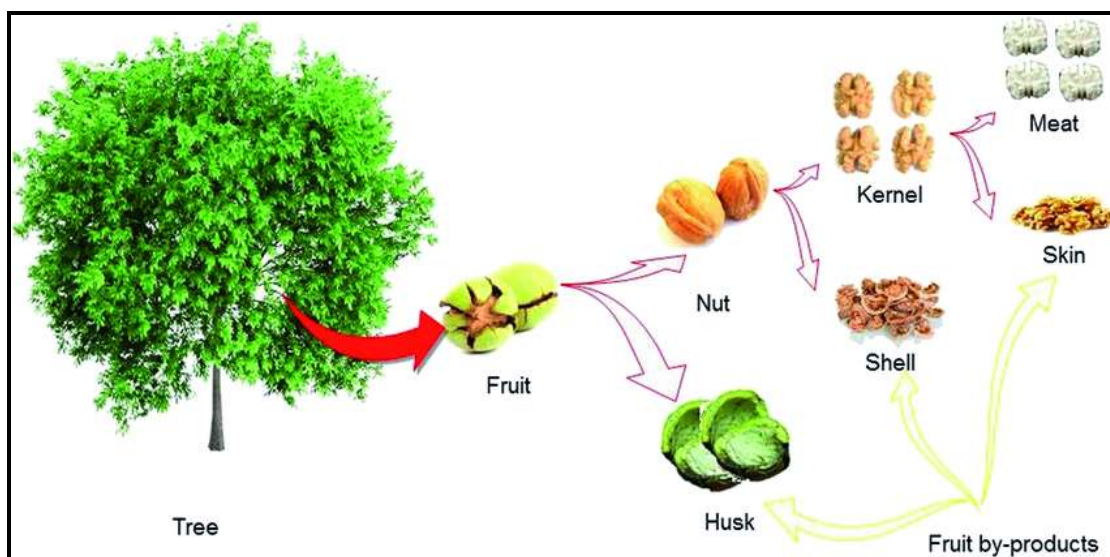


Figure No.3. Different parts of walnut fruit and the corresponding by-products.

The major walnut growing states of India are Jammu and Kashmir, Uttarakhand, Himachal Pradesh and Arunachal Pradesh. Among these, Jammu and Kashmir occupies the largest share in total area and production. India is the 8th largest producer of walnut in the world and J&K stands first in the country, accounting for 92% of the production. Around 87,000 tonnes of walnut kernels are being produced annually from 40 lakh walnut trees cultivated on 61,000 hectares of land across the state.

Walnuts are available in Indian markets in two forms. These are in-shell walnuts (kernel inside the shell) and shelled walnuts (kernels obtained by shelling whole walnuts). The kernel being the edible portion has got the ultimate bearing on the economic returns. Walnuts have an inherent potential for prolonged storage. However, their shelf- life is governed by the physical characteristics of in-shell nuts, moisture content of the kernels and microbial status of the kernels after shelling.⁵⁻⁶



Figure No. 4. Walnut fruit



Figure No. 5. Walnut Septum / membrane

A. The healing properties of walnut partitions⁷

The medicinal properties of the partitions are due to the rich content of elements that have a positive effect on individual organs and systems of an individual. It is worth considering the main constituents that make up the chemical composition of the invention.

- **Potassium.** Helps normalize water content in the body, increases the metabolic rate of carbohydrates and proteins. Decreases heart rate. Continues the acid-base balance at the required level. Maintains the total content of ingredients in the blood. Promotes weight loss.
- **Iodine.** Contributes in the processes of energy exchange, biological and chemical reactions, accommodation of many vitamins. Helps the body to grow properly, both physically and mentally. Like the earlier element, it promotes the effective metabolism of nutrients in the body. Normalizes body temperature. Increases the absorption of oxygen by numerous tissues. Iodine grows brain activity, gives the body more energy, helps burn additional fat, and keeps hair, skin, nails and even teeth healthy.
- **Magnesium.** It is an essential part of all body tissues. Participates in cell formation, digestion, and brain function. Regulates energy metabolism, kidney function, digestion. Increases the efficiency of the heart and blood vessels, affects the tone and strength of the muscles. Stabilizes the nervous system.
- **Carotene.** Strengthens the immune system, significantly reduces the risk of infectious diseases. Helps remove substances from the body that are not involved in biological processes.
- **A nicotinic acid.** Serves for the regulation of cholesterol in the blood and tissues, maintains glucose levels, and resists free radical attacks. Contributes in the production of hormones and tissue respiration.

The following positive properties of nut membranes are distinguished:

- Increase the body's immunity;
- Saturate the body with iodine;
- Soothe in situation of nervous disorders, stress, irritability, insomnia;
- Progress heart function;
- Create antiviral and antimicrobial protection;
- Decrease blood sugar;
- Improve the work of the digestive system;
- Encourage the resorption of tumors and cysts;
- Have an antiseptic outcome;
- Reduce the presence of cholesterol in the blood, thereby refining the state of blood vessels and stopping the risk of atherosclerosis;
- Reduce pain and relieve inflammation in several joint pains.

The product is effective for bowel disorders. A decoction from the membranes not only helps to stop diarrhea, but also removes toxins from the body, defends against dehydration. Walnut partitions are used in the treatment of numerous female diseases (hormonal disruptions, reproductive system disorders). With regular intake of infusion and decoctions, it relieves painful menstruation, mastitis, mastopathy, various neoplasms, and decreases the symptoms of menopause.

What walnut partitions help with

Walnut partitions are used in folk medicine for the following diseases:

- hormonal disorders of various kinds;
- male diseases (prostate adenoma, prostatitis, weak potency);
- respiratory tract diseases (bronchitis, pneumonia, in some cases asthma);
- bowel diseases (diarrhea, colitis, helminths);
- female diseases (fibroma, myoma, mastopathy);
- colds (colds, flu, runny nose);
- diseases of bones and joints;
- disorders of the nervous system and mental disorders;
- endocrine system diseases;
- oncological diseases.

I. Walnut Septa for Thyroid Gland⁷

It is a known fact that walnut shells are rich in iodine. Iodine shortage in the body leads to various endocrine disorders. With a lack of iodine, the thyroid gland is disrupted, a person becomes more irritable, weak, and puberty slows down.

II. Walnut partitions for joints⁷

- Tincture of walnut shells has been shown to be real for joint pain, radiculitis.
- Fill a half-liter container by a third with membranes and fill it 2/3 with vodka (double-distilled moonshine or alcohol diluted to 40%). Put in a place protected from light for 15-20 days, filter.
- Applied outwardly for rubbing into painful areas, as well as to increase efficiency, take 1 teaspoon orally half an hour before meals or on an unfilled stomach.

III. Cleaning of vessels with walnut partitions⁷

- For the standard functioning of the body, it is compulsory to periodically clean the blood

vessels. For these purposes, you can make a tincture of walnut partitions.

- To do this, take a glass of ground partitions and pour half a liter of vodka. Insist for two weeks, filter. Take 15-20 drops, dissolved in a small amount of water three times a day for fourteen days.
- There is also a good recipe for dismissing vascular spasms, as well as for controlling blood pressure.
- A glass of ground partitions is mixed with hawthorn tincture (diluted with water in a 4: 1 ratio, that is, 100 ml of cold purified water is needed for 400 ml of hawthorn). Insist for seven days, then filter.
- Take three times a day 30 - 40 minutes before meals (on an empty stomach) a single dose of 5 ml. The course of treatment is one and a half months.

IV. Walnut partitions for men⁷

- Walnut membranes contain zinc and magnesium, minerals important for potency. They are portion of the hormone (testosterone), increase sperm motility.
- Due to the content of fatty acids, the permeability of the containers is restored, and, as a result, the blood supply to the organs is enhanced.
- For the treatment of prostatitis and adenoma, you can successfully use tinctures that contain useful substances from the partitions of walnuts.
- Half a glass of partitions is poured with 250 ml of water. The dividers of walnuts are brewed and left for 20 minutes to infuse. Then it is filtered. The broth is taken 15 ml three times a day before meals. The required course of treatment is from 2 to 4 weeks.

V. Walnut partitions with menopause⁷

- The essence of the treatment of menopause with folk medicines is reduced to the normalization of hormonal equilibrium. Indications are mitigated (irritability, depression, poor sleep). Partitions are considered an effective folk medicine for improving well-being.
- To prepare the broth, take membranes from 5 walnuts, pour a glass of cold water. In the morning, boil for several minutes, filter well, add one tablespoon of honey (not desirable last year). They must drink on an empty stomach

or not earlier than 30 - 40 minutes before meals.

VI. Walnut membranes in diabetes mellitus⁷

- Medicinal tinctures and decoctions from walnut partitions, with regular use, decrease blood sugar levels, remove unpleasant indications of the disease (thirst, weakness, itching) and improve well-being.
- The effectiveness of tinctures and decoctions is observed only with complex action together with traditional methods of treatment.
- To prepare the broth, a glass of membranes is poured with a glass of boiling water and cooked over low heat for one hour. The resulting broth is cooled, filtered. Take one teaspoon half an hour before meals. The course of treatment should be four weeks.
- To prepare the tincture, take two tablespoons of partitions and fill them with half a liter of vodka, insist for two weeks, filter. Take 8-10 drops, diluted in a small quantity of water 20 minutes before meals. The course of treatment is from two weeks to a month, the duration depends on the severity of the disease.

B. Contraindications to the use of walnut membranes⁷

Taking any medicine, you must read the contraindications for use. If they are, then you must refuse to take this drug.

- For example, you cannot use a decoction and tincture of walnut partitions for eczema or psoriasis, neuro dermatitis, urticaria, since even larger rashes on the body are possible.
- If you suffer from allergies, then you should refuse treatment with a tincture of walnut partitions, as there is an opportunity of itching and rashes on the skin, coughing fits (in some cases, even Quincke's edema is possible).
- Since walnut partitions have a strong result, it is impossible to use for pregnant women and it is undesirable to take women who are breastfeeding, children under five years of age (after 5 years, only a decoction can be given).
- You cannot use the tincture for diseases of the gastrointestinal tract. Ulcers and gastritis are contraindications to treatment with walnuts, especially on an empty stomach.
- You should not immediately drink the full portion indicated in the recipe, even if there are no contraindications, as allergic reactions are possible. In this case, you should take the drug and refuse this treatment.

C. Phytochemicals and Biological Activities of Walnut Septum⁸

Walnut septum was anatomized in several studies, its phytochemical profile described, and some of the natural conditioning examined. still, compared to other walnut by- products, no comprehensive review to gather all the material scientific knowledge was set up in the literature. thus, the end of this study was to critically assess the information furnished by peer- reviewed papers regarding the walnut septum chemical composition and the affiliated natural conditioning, including antioxidant conditioning, anti-inflammatory goods, antimicrobial parcels, antidiabetic conditioning, anti-tumor parcels, and anti-aging eventuality. In conclusion, as these preclinical studies showed that walnut septum metabolites were responsible for a wide range of preventative and remedial uses, farther exploration should confirm the salutary issues in clinical trials. We consider walnut septum to be an important natural matrix, a rich natural source of bioactive composites that deserves to be delved in the future in order to be completely exploited in the food, ornamental, or pharmaceutical assiduity.

D. Investigation of antioxidant and antimicrobial activities of walnut (*Juglans regia L.*) kernel septum⁹

Walnut (*Juglans regia*L.) kernel septum (or septa) (WKS), a traditional nutraceutical material in China, has not been explored in detail. In this study, antimicrobial exertion, total phenolic content (TPC) and antioxidant- oxidant status of WKS was delved in case it may be clinically important in the operation of colorful complications. styles The WKS was uprooted with ethanol in a Soxhlet device. TPC of WKS was analysed by using Folin- Ciocalteu's system. Antioxidant exertion was attained by using Rel Assay Diagnostics accoutrements. The antimicrobial exertion of WKS was estimated against two Gram-positive (*Staphylococcus aureus*, *Bacillus subtilis*), one Gram-negative bacteria (*Escherichia coli*) and one fungus (*Candida albicans*) strains using the agar prolixity system.

Results The TPC of WKS was set up to be 119.42 ± 2.39 mg GAE/ gDW. It was determined that total antioxidant status (TAS), total oxidant status (TOS) and oxidative stress indicator (OSI) values were 7.542 ± 0.389 mmol/ L, 3.718 ± 0.287 μ mol/ L and 0.049 ± 0.001 , independently. WKS widely inhibited the growth of Gram positive

bacteria and fungus, while *S. aureus* was the most susceptible one with 16 mm of inhibition zone. Gram-negative bacteria were resistant to the extract. Conclusions as far as we know, this paper is the first work that demonstrates the antioxidant-oxidant status of WKS by using the system described over, and also there are no scientific reports which have examined WKS in such a multidisciplinary experimental design. This study explosively supports the reported traditional use of WKS. Results indicated that WKS can be used as a pharmacological natural agent due to its high antioxidant and antimicrobial conditioning.

E. Walnut (*Juglans regia* L.) Septum: Assessment of Bioactive Molecules and In Vitro Biological Effects¹⁰

Food and agrarian assiduity by-products can represent precious and affordable sources of bioactive composites. Thus, our study aimed to increase the knowledge regarding walnut septum, a by-product that presently has limited use. The results of work indicate that walnut septum can be a source of natural biologically active moieties. As far as we know, we determined for the first time the tocopherol content in this vegetable matrix. The tocopherols and the phenolics set up in WSE present antioxidant and anti-inflammatory conditioning, or can help cholesterol and lipid peroxidation, thus, significantly contribute to the precious goods of walnut septum on health. Further, our trial delved the in vitro goods of septum extract on some crucial enzymes involved in pathologies including neurodegenerative diseases, diabetes, and rotundity. Walnut septum contains important α -glucosidase and lipase asset phytochemicals that can obstruct salutary carbohydrate or lipid metabolism. Also, this is the first study to demonstrate that walnut septum extract presents antimicrobial and antimutagenic eventuality, as well as strong antioxidant and anti-inflammatory conditioning. Thus, using septum as a source of phytochemicals can lead to the valorization of this by-product and may increase the value of walnut product.

F. Effects of Walnut Septum on The Enzyme Pathways Associated with Plasma Cholesterol Level¹¹

Cholesterol is pivotal emulsion that plays vital part in cellular function in living organisms. Its redundant or insufficiency in tube can lead to destruction and decomposition of cell membrane structure. Maintaining balanced input of cholesterol

in diet and seeking medical treatment, if necessary, can help these negative goods. Likewise, people frequently resort to natural and herbal remedies, similar as walnut septum. Due to dearth of scientific data regarding goods of walnut septum on cholesterol metabolism, this exploration was accepted to explore its implicit goods. Analysis was begun by rooting septum using colorful detergents. Performing extracts were also anatomized using GC-MS, and composites were linked by using an intertwined library database. To describe goods of extracts on cholesterol esterase and HMG CoA reductase, a colorimetric system was employed. Results Monophenol, 2,4-Di-tert-butylphenol, 2,6-Di-tert-butylphenol, ethyl linoleate, and butyl linoleate were some of composites detected by GC-MS scanning. The loftiest inhibitions were observed in the enzymatic analysis, with a rate of 3.2 (acetone) in the HMG-CoA reductase analysis and 13.6 (water) in the cholesterol esterase analysis. Conclusions Although the walnut septum extract contains colorful chemical composites, the in vitro analysis data suggest that there's no inhibitory effect at remedial position on enzyme pathways that regulate tube cholesterol situations, videlicet HMG-CoA reductase and cholesterol esterase. We believe that farther exploration is necessary to exhaustively estimate its goods on other pathways.

To clarify claims of cholesterol regulation by consuming walnut septum, the delved goods of septum extracts on enzymes that are involved in enzyme pathways associated with tube cholesterol situations. They determined that the septum didn't have a conspicuous inhibitory effect on either cholesterol esterase, which is responsible for immersion of cholesterol from bowel, or HMG-CoA reductase, which is responsible for intracellular cholesterol product, in vitro. Low rate of inhibitions led us to consider goods of colorful substances that surfaced in content of walnut septum grounded on birth system used. Accordingly, this exploration yielded good of note data indicating that the walnut septum extracts prepared in detergents of different oppositeness, despite having colorful chemical factors, didn't have a remedial position inhibitory effect on two different enzyme pathways that regulate the tube cholesterol position. They consider that farther exploration will be demanded to estimate its goods on other pathways deeply.

II. CONCLUSION

Having considered the medicinal parcels of walnut partitions and contraindications, don't forget that this is a medicine. This means that it's largely judicious to consult a Doctor about the possibility of taking, lozenge and duration of treatment.

In conclusion and summary, phytochemical evaluation of walnut septum verified the presence of high quantum of phenolic composites and desirable radical scavenging and tyrosinase inhibitory conditioning. also, some experimental workshop has demonstrated its antibacterial, anti-tumor, antidiabetic and food preservative capabilities. Taken together, these parcels are opening up new possibilities regarding salutary goods of walnut septum on neuro degenerative conditions (like Parkinson complaint) and skin diseases (hyperactive saturation due to melanin as well as skin wrinkle conformation). None the less, farther studies are needed to probe other probable pharmacological conditioning of walnut septum.

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