

A Broad Spectrum Activity of Abhal (*Juniperus communis*) with Special Reference to Unani System of Medicine. A Review

* Dr. Aafiya Nargis ¹, Dr. Ansari Bilquees Mohammad Yunus ², Dr. Sharique Zohaib ³,

Dr. Qutbuddin Shaikh ⁴, Dr. Naeem Ahmed Shaikh ⁵

¹ Associate Professor (HOD) Dept. of Niswan wa Qabalat, Mohammadia Tibbia College, Mansoor, Malegaon

² Associate professor, Dept. Tashreeh ul Badan, Mohammadia Tibbia College, Mansoor, Malegaon.

³ Associate Professor (HOD) Dept. of Saidla, Mohammadia Tibbia College, Mansoor, Malegaon

⁴ Professor (HOD), Dept. of Tahaffuzi wa Samaji Tibb, Markaz Unani Medical College and Hospital. Kozhikode.

⁵ Professor (HOD), Dept. of Ain, Uzn, Anf, Halaq wa Asnan, Markaz Unani Medical College and Hospital.

Kozhikode.

Abstract:-

Juniperus communis is a shrub or small evergreen tree, native to Europe, South Asia, and North America, and belongs to family Cupressaceae. It has been widely used as herbal medicine from ancient time. Traditionally the plant is being potentially used as antidiarrhoeal, anti-inflammatory, astringent, and antiseptic and in the treatment of various abdominal disorders. The main chemical constituents, which were reported in *J. communis* L. are α -pinene, β -pinene, apigenin, sabinene, β -sitosterol, campesterol, limonene, cupressuflavone, and many others *Juniperus communis* L. (Abhal) is an evergreen aromatic shrub with high therapeutic potential in human diseases. This plant is loaded with nutrition and is rich in aromatic oils and their concentration differ in different parts of the plant (berries, leaves, aerial parts, and root). The fruit berries contain essential oil, invert sugars, resin, catechin, organic acid, terpenic acids, leucoanthocyanidin besides bitter compound (Juniperine), flavonoids, tannins, gums, lignins, wax, etc. Conventionally the plant is being potentially used as antidiarrhoeal, anti-inflammatory, astringent, and antiseptic and in the treatment of various abdominal disorders. Recent studies have also found anti-inflammatory, cytotoxic, hypoglycemic and hypolipidemic effects of juniperus berries in experimental replicae. In this review article unani as well as modern concept of juniperus (abhal) have been covered.

Keywords: *Juniperus*, Abhal, lignin, juniperine, wax, Pharmacological activity of Abhal etc.

1. Introduction

Plants have been used as primary sources of disease treatments from ancient times and till to date a number of species have been reported to possess various pharmacological activities. From ancient time herbs had been used by all cultures of the world including India that has one of the oldest, richest, and most diverse culture. Advances in clinical research and quality control showed a greater value of herbal medicine in the treatment and overcome from many diseases. *Juniperus* genus is a well-known source of cedarwood oil which is widely distributed in the North hemisphere and it is used in folkmedicine. *J. communis* L. is a shrub or small evergreen tree belonging to family Cupressaceae. The plant has been reported as diuretic, having anti-inflammatory properties, antifungal activity, analgesic activity, hepatoprotective activity, antidiabetic and antihyperlipidemic activity, antimicrobial activity, antioxidant activity, antihypercholesterolemic activity, antibacterial activity, anticataleptic activity, and neuroprotective activity in Parkinson's disease. The analysis of the volatile fraction of *J. communis* berries was done by HS-SPME coupled to GC/MS for gin aromatization and more than 20 constituents have been reported.

2. Description of *Juniperus communis*.

The Juniper tree, in all its species and varieties, is found in abundance in the Eastern Mediterranean, and all over the Mediterranean basin; it is also found in northern Europe, and can be found, in one variety or another, virtually all

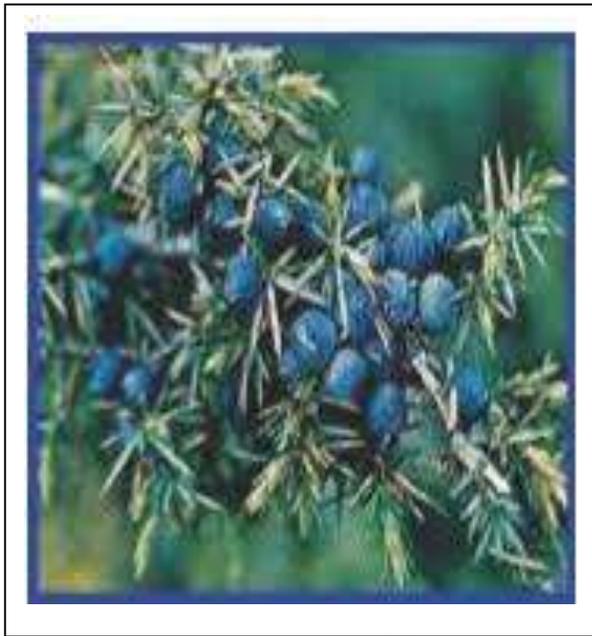


Fig. 1 Abhal Fruits during cultivations

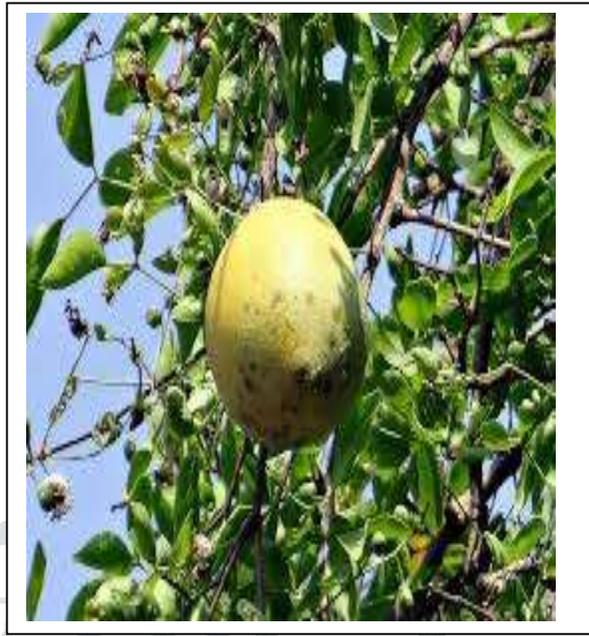


Fig. 2 Abhal Fruits during cultivations

over the world. It is a botanical relative of the Cypress tree, and is a fragrant, hardy evergreen tree that bears aromatic dark blue berries. Evergreen trees are so full of the Life Force that they never go into a seasonal death or hibernation, like deciduous trees do; for this reason, astrological herbalists like Culpeper consider Pine, Juniper and other evergreen trees to be under the dominion of the Sun, as they stoke or stimulate the vital fires of the body, which govern and regulate digestion, metabolism and circulation. Being so aromatic in nature, the fruits, needles and essential oils of Juniper and other evergreen trees are also strongly antiseptic, focusing their cleansing, disinfectant action principally on the respiratory, digestive and genitourinary tracts. Being so fragrant and aromatic, the berries, the bark, the resin and the distilled essential oil of the berries all have their uses and applications in natural aromatics and perfumery, as well as in aromatherapy. The resin, and even the resinous bark, of the Juniper tree can be burned as incense, as can the berries as well. Juniper berries have a clean, fresh, Christmas tree –like scent that is used to flavor Gin. The aromatic essential oil of Juniper is extracted from the berries via steam distillation, and the optimum time for essential oil yield for extraction is right before the berries achieve their full darkening and ripening; after this, the essential oil changes to resin. Simmering Juniper berries in a steam inhaler and inhaling the steam is very beneficial for decongesting the lungs and respiratory tract, and facilitating the expectoration of phlegm. The essential oil of Juniper also disinfects the digestive tract, stimulates the stomach and digestion, and relieves bloating, flatulence and colic. The urinary tract is also cleansed and disinfected by Juniper's essential oil, which has a mild diuretic effect. Juniper berries have a mild diuretic effect that is produced not so much by a strong provocation of the kidneys and urinary tract as it is by stoking the metabolic fires of the body, especially those of the liver and pancreas. The strengthened and stimulated metabolic fires then improve the circulation and metabolism of the opposite yet complementary element of Water, removing edema and excess fluid buildup via the kidneys and urinary tract. Even though Juniper berries are generally considered to be a mild diuretic, they work by provoking a mild irritation of the kidneys; therefore, many herbalists don't recommend Juniper berries if one's basic urinary function is compromised, or if there should be any lingering chronic irritation or inflammation of the genitourinary passages and membranes.

Listen to your body, and how it reacts to Juniper; if it aggravates urinary irritation or inflammation, discontinue use. Juniper berries also improve and increase the efficiency of glomerular filtration in the kidneys, and their antiseptic essential oil has a great disinfecting action on the urinary tract. Juniper berries also help the kidneys eliminate accumulations of excess uric acid, so they are valuable in treating gout. Because Juniper berries have the potential to be mildly irritating to the urinary passages, they are often combined with soothing, emollient diuretics like Corn Silk. If additional buffering is desired, then other urinary emollients like Marshmallow or Licorice roots may also be added. Juniper berries have also attracted a lot of attention from the medical community lately as a metabolic stimulant that may be valuable in treating type 2 diabetes. How do Juniper berries aid in the treatment of type 2 diabetes? First of all, they lower blood sugar and treat the symptoms of hyperglycemia, or high blood sugar, without producing any adverse effects, such as troughs of excessively low blood sugar. Secondly, Juniper berries reduce insulin resistance and enhance the cellular uptake of glucose from the bloodstream. Thirdly, they improve the delayed wound healing that is so common among diabetics. Fourthly, Juniper berries improve digestion, which can often be slow and sluggish in diabetics. Fifthly, Juniper berries have an antioxidant and protective effect on the heart and circulatory system, which protects against the potential cardiovascular complications of diabetes, like heart disease and high blood pressure. Sixthly, they improve kidney function and glomerular filtration, which can often be weak in diabetics, thereby relieving fluid retention and edema. And finally, they encourage the breakdown of peripheral fat deposits in the body, especially cellulite – and obesity and weight gain can be a major aggravating or complicating factor in type 2 diabetes. Since Juniper berries are loaded with vitamins, minerals and antioxidants, and also stimulate the stomach and digestion, they are a common ingredient in herbal condiments, jellies and tapenades. Juniper berries are often combined with Peppermint or other mints in condiment jellies that are eaten with heavy meats like lamb to facilitate their digestion. Juniper berries can also be soaked in red wine, along with other herbal berries like Hawthorn, or with various fruits in an herbal *Sangria*, to add a distinctive fresh, zesty flavor. Blend in Juniper berries with Olive Oil, fresh Ginger, Horseradish and also a little Garlic to make a zesty tapenade to be served as a condiment with meats. Juniper berries can also be included as an ingredient in beverage herb teas whenever a distinctive evergreen taste and aroma is desired. Juniper berries, as an aromatic and pungent digestive stimulant, are also a common ingredient in digestive bitter formulas, along with bitter tonics like Gentian or Blessed Thistle; they can also be used in digestive liqueurs. Perhaps the simplest way to enjoy Juniper berries is to munch on the dried berries after meals to aid the digestion, or to snack on them throughout the day. In his *Canon of Medicine*, Avicenna gives us a lot of interesting uses for Juniper berries. The powder of Juniper, he tells us, is useful topically to help disinfect wounds, and in checking the foul decay of spreading black ulcers. He recommends mixing the powdered dried Juniper berries with honey to make a paste for this purpose; honey itself has a long and ancient history as a disinfectant dressing for wounds, dating all the way back to ancient Egypt. Avicenna also recommends frying Juniper berries with Sesame Oil in a skillet until the berries become black; then using the strained Juniper / Sesame oil as ear drops to help in deafness. Juniper berries, he tells us, are very useful in treating chest pain and coughing – I suppose by drinking a hot infusion of the berries. The Juniper berry, Avicenna tells us, is not merely a diuretic; it is also a urinary relaxant that eases the passage of kidney and bladder stones; a lot of modern herbalists would agree with this observation. Avicenna tells us that Juniper berries are an emmenagogue that not only stimulates menstruation, but also treats hysteria and pains in the uterus; for these reasons, women should not take Juniper berries while they are pregnant or nursing. Juniper berries were also a key ingredient in a multipurpose medicine, incense and perfume preparation called *Kyphi*, which Plutarch tells us was used by the Egyptians for just about everything. In addition to Juniper berries, its ingredients included Cinnamon, Bay Laurel, Peppermint, Valerian root, Calamus root, Orris root, Cyperus or

Nutgrass root, Galangal, Pine resin, Myrrh, Mastic turpentine, honey, red wine and raisins. I have made some myself, and have burned it as incense; it emits a wonderful fragrance. The Egyptian *Kyphi* recipe then became the nucleus for a very complex recipe pioneered by the great Greco-Roman physician Galen: Theriac. Its manufacture as a universal antidote for poisons was raised to a high art in Venice, where it became known as Theriac Venizian, or Venice Treacle; this formula, containing over sixty ingredients, made into a medicinal jam or electuary, was an official medicine in many European pharmacopeias until the nineteenth century. Juniper berries, being strongly heating and drying, were also considered in ancient times to be an herb that resists poison, being useful for insect bites and poisoning; the berries and their essential oil are also a good insect repellent.

3. History of the Use of *Juniperus communis*

Evidences have been discovered that the juniper berries were utilised since the ancient times. Traces of the plant were found in several historical sites in Egypt along with tombs. However, there weren't any evidences attesting that the Egyptians grew the juniper plant, some were found within the tomb of Tutankhamun. Then the berries from Egypt might have been exported from Greece. They'd records of utilizing the juniper berries as herbal medicine. Also, throughout Olympic events, the Greek athletes utilize the berries to improve their stamina. The Romans also have used the juniper plant because of their benefits. The berries were replaced to black as well as long peppers that are extremely expensive coming from India. The plant was also broadly grown in European countries particularly Hungary. The oil made out of Hungary originated from fresh berries. The production then prolonged to Great Britain along with other northern European colonies after war has ensued. This was because of the increase of the price of foreign oil.

4. Ancient Uses *Juniperus communis*

Juniper Berries were utilized like a flavoring for gin, a kind of liquor made in the 17th century within the Netherlands. The Western American Native Tribes have used these berries to control appetite during times of famine as well as hunger. Alternatively, Juniper Berries was basically meant for medications due to its being a diuretic and good cure for arthritis as well as rheumatism. Apart from the therapeutic and cookery benefits derived from Juniper Berries, the Native Americans also provide used the seeds of the berries for adornment and jewelry. The Swedes utilized the extracts from Juniper Berries like external medication to treat inflamed joints and wounds.

5. Modern Uses *Juniperus communis*

Juniper Berries are externally utilized for the management of athlete's food, acne, and dandruff. Additionally it is useful for the management of cystitis as well as urethritis because of its antiseptic features. The anti-biotic abilities of Juniper Berries are great for dealing with numerous wounds or sores like psoriasis, eczema, along with other skin problems. Juniper Berries are extremely abundant with nutrients that offer numerous health advantages to most people. They're full of Vitamin B as well as Vitamin C, and small quantities of calcium, protein, carbohydrates, fiber, lipid, and ash.

6. Culinary uses *Juniperus communis*

- A. Add dried berries to vegetable pates venison, game and marinades.
- B. Juniper berries are used to make sauce and used to flavor pheasant, quail, rabbit, veal, pheasant, venison and other meat dishes.
- C. Grounded dried berries are used for preparing mush or cake.
- D. Use the berries as a spice to flavor liquors, gin, bitters, cordials and Swedish beer.
- E. Roasted seeds are used as a substitute for coffee.

- F. Use the Juniper leaves (fresh or dried) to flavor grilled fish.
- G. Leaves and woods are used on barbeque to add subtle flavor meat.

7. Side Effects, Overdose & Other Considerations *Juniperus communis*

Even though Juniper works well for the kidney function, long-term utilization of the herb may harm or even irritate the kidneys. Overdose of the herb can lead to smelly urine and often blood within the urine. Herbalists suggest utilizing Juniper supplements for not greater than 4 weeks at a time. According to experts, inhaling the herb in vapor form is definitely the safest method.

Pregnant women need to stay away from this herb as it might result in uterine contractions. The herb ought to be prevented by those people who are positively trying to get pregnant. Other side effects of the herb consist of skin irritations, diarrhea as well as seizure. Prevent the herb in individuals struggling with low blood sugar and people along with stomach & intestinal disorders. Also, Juniper supplements should be stopped fourteen days before a scheduled surgical treatment.

- A. Avoid the juniper berry in case you have serious kidney problems as it might worsen the problem as well as result in further damage.
- B. If you utilize a lot more than the recommended quantity, it's likely that you can have problems with diarrhea, kidney pain, hypertension, fast heartbeat as well as purplish urine.
- C. When taken internally, it may impact the absorption of iron as well as other minerals.
- D. Open wounds are best not dealt with juniper since it may cause irritation as well as swelling.
- E. Diabetics needs to be careful while using the juniper as it can certainly boost the levels of glucose within the body.

8. Pharmacological Activities of Abhal (*Juniperus communis*) in Unani System of Medicine.

A. Hepato-protective Activity of Abhal.

The hepatoprotective activity of *J. communis* in rats was determined by given CCl₄ administration for 9 days. In CCl₄ treatment group was showed significant increase in serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvic transaminase (SGPT), total bilirubin (TB), and alkaline phosphatase (ALP) values when compared to control group. There was significant decrease in the level of SGPT, SGOT, TB, and ALP in silymarin treated group. The abnormal high level of SGOT, SGPT, ALP, and bilirubin observed was due to CCl₄ induced hepatotoxicity. *J. communis* reduced the increased levels of serum SGPT, SGOT, ALP, and bilirubin, which showed protection against hepatic cells (ethanol and aqueous extract show better protection).

B. Anti-Inflammatory Activity of Abhal.

Because of the anti-inflammatory qualities of juniper berries, they turn out to be quite helpful towards diseases just like gout, cystitis, bronchitis and so on. Additionally they offer assist to relieve swelling. Juniper berries can be used as manufacturing therapeutic drugs for the treatment of rheumatism as well as for reducing pains related to arthritis. Anti-inflammatory activity of *J. communis* fruit has determined using isolated cells and enzymatic test. The plant showed varying degree of activity at 0.2mg/mL in prostaglandin test and 0.25mg/mL in platelet activating factor (PAF) test (aqueous extract). *J. communis* showed 55% prostaglandin inhibition and 78% PAF-exocytosis inhibition. The PAF activity was measured by inducing exocytosis of elastase. All plant extracts were studied on thin layer chromatography eluted with ethyl acetate/methanol/water.



Fig. 3 Abhal as Analgesic

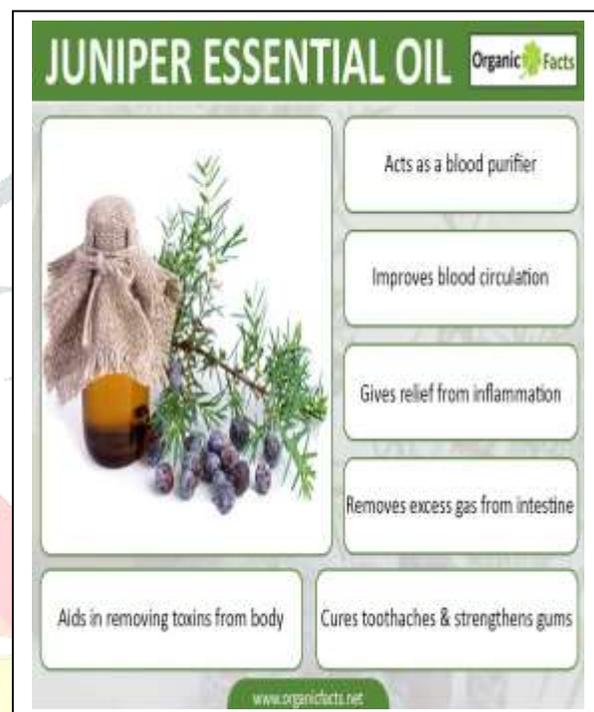


Fig. 4 Abhal oil as various actions

C. Antioxidant Activity of Abhal.

Antioxidant-rich foods are important for health, as they help protect your cells against damage that may otherwise lead to illness. Juniper berries are rich in essential oils and flavonoids that function as potent antioxidants and may help reduce inflammation. One test-tube study detected over 70 compounds in juniper berry essential oil, with the monoterpenes alpha-pinene, beta-pinene, myrcene, limonene, and sabinene making up the majority. All of them add to the oil's strong antioxidant effects. The study found that the oil reduced cellular damage in yeast cells by increasing the activity of the enzymes catalase, glutathione peroxidase, and superoxide dismutase. The main role of these enzymes is to protect cells from free radical damage. Antioxidant activity has reported the in vitro antioxidant activity of plant using different assays like DPPH scavenging, superoxide scavenging, ABTS radical cation scavenging, and hydroxyl radical scavenging. The antioxidant effects of the oil were confirmed by in vivo study and created the possibility of blocking the oxidation processes in yeast cells by increasing the activity of the antioxidant enzymes.

D. Anti-Aging and Skin Disorder of Abhal

Juniper berries can't just assist you to appear younger yet likewise stay younger as well as preserves your young people since it is a restorative for healthy and balanced respiratory system, digestive system, blood circulation.



Fig. 5 Abhal used in cosmetics

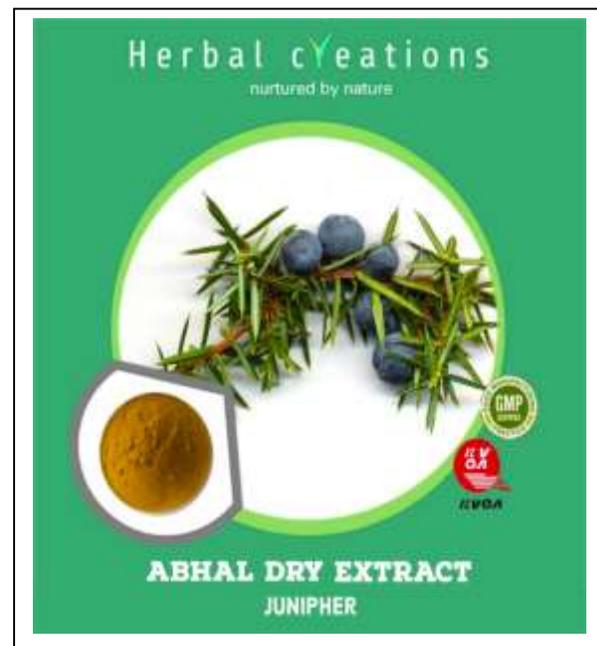


Fig. 6 Abhal as antiaging

Anxious in addition to excretory system. a healthy as well as balanced mind and also physical body could keep you youthful for extended. Together with these benefits, juniper berries could additionally possess some side results. Be aware just before consumption. It may result in allergies, itching, swelling, skin irritability and in addition difficulty in breathing. If you get on lithium medication do not eat these berries since they react negatively along with lithium. Do talk to your healthcare professional if important. Also much usage of juniper berries may also result in diarrhea, convulsions or even DNA damage. Juniper has additionally been utilized in dealing with common skin disorders like itching, scabs as well as leprosy. Native American Indians utilized Juniper to deal with skin wounds. However, modern science doesn't suggest using herbs to open wounds. As well as other herbs, Juniper is additionally utilized to deal with psoriasis of the scalp.

D. Antidiabetic and Anti-hyperlipidemic Activity of Abhal.

Juniper berries lower blood glycemic levels, in accordance with research published in 1994 in "Planta Medica." The study's researchers, led by Fermin Sánchez de Medina from the Universidad de Granada in Spain, discovered that juniper berries reduce glycemic levels by enhancing the secretion of glucose-induced insulin. Researchers gave the berries to rats along with artificially induced hyperglycemia, plus they produced considerable decrease in glucose levels. *J. communis* was reported to have antidiabetic and antihyperlipidemias activity in streptozotocin- (STZ-) nicotinamide induced diabetic rats. *J. communis* (methanolic extract, 100mg/kg and 200mg/kg p.o.) was administered except to the group that received (glibenclamide 10mg/kg). Biochemical estimation and fasting blood glucose levels were estimated on the 21st day. The methanolic extract of *J. communis* mediated significant ($P < 0.01$) reduction in blood glucose levels and increase in HDL levels in diabetic rats. Glibenclamide (standard drug) showed a significant decrease in the level of SGPT and SGOT. Methanolic extract of *J. communis* showed a significant anti diabetic and antihyperlipidemic activity.



Fig. 7 Abhal as various pharmacological action

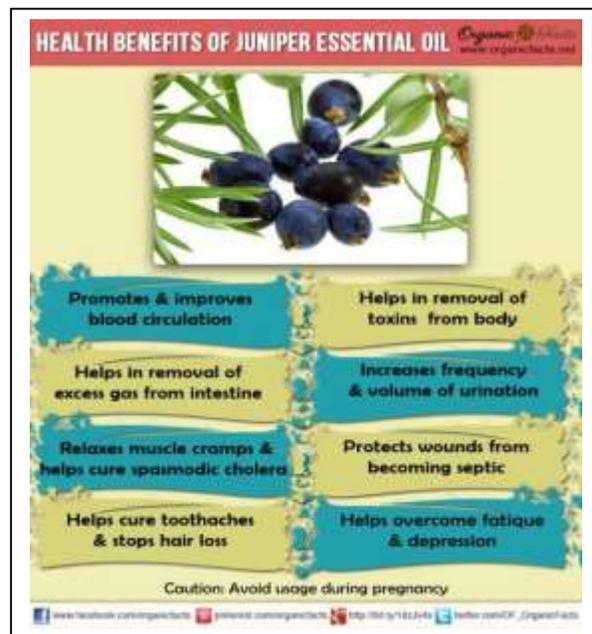


Fig. 8 Abhal as various pharmacological action

Juniper berries lower blood glycemic levels, in accordance with research published in 1994 in “Planta Medica.” The study’s researchers, led by Fermin Sánchez de Medina from the Universidad de Granada in Spain, discovered that juniper berries reduce glycemic levels by enhancing the secretion of glucose-induced insulin. Researchers gave the berries to rats along with artificially induced hyperglycemia, plus they produced considerable decrease in glucose levels.

Juniper berries were used in traditional medicine practices to treat diabetes, and recent studies confirm that they may have antidiabetic properties. A study in rats with diabetes observed that supplementing with juniper berry extract significantly reduced blood sugar and increased heart-protective HDL (good) cholesterol. Similarly, another study on the antidiabetic effects of Chinese juniper berry extract found that it significantly reduced blood sugar, cholesterol, and triglyceride levels in rats with diabetes. Researchers believe that these antidiabetic effects are due to the berries’ high concentration of antioxidants. Though these findings are promising, research in humans is needed to confirm this potential health benefit.

E. Analgesic Activity of Abhal.

Banerjee and collaborators reported the analgesic activity of *J. communis* using methanolic extract. The methanolic extract was given at a dose of 100mg/kg and 200mg/kg and evaluated for its analgesic activity. Acetylsalicylic acid was used as standard (100mg/ kg). In vivo the extract was evaluated by different tests like formalin test, acetic acid induced writhing, and tail flick tests. *J. communis* showed a significant ($P < 0.01$) and dose dependent effect on inhibition of writhing response and dose dependent inhibition in the late phase as compared to aspirin ($P < 0.01$), formalin test. The blocking effect of naloxone (2mg/kg i.p.) confirms the central analgesic activity. The plant showed significant antinociceptive activity and it has been established that the methanolic extract of *J. communis* acts both peripherally and centrally.

F. Antibacterial Activity of Abhal.

Together with antioxidant powers, juniper berries might also have anti-bacterial qualities. A German research published within the international peer-reviewed journal “Natural Products Communications” in 2010 analyzed the chemical composition of countless essential oils, which includes oil from juniper berries. The antibacterial elements

of the oils were examined against a number of different strains of bacteria, which includes that from spoiled food, food-poisoning-related bacteria and both animal- and plant-based pathogens. Juniper oil limited bacteria's activity,



Fig. 9 Abhal as various pharmacological action

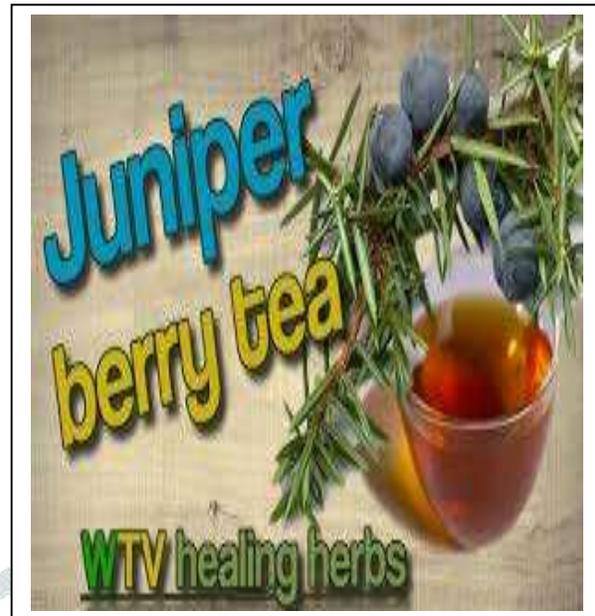


Fig. 10 Abhal extract tea as antioxidant

displaying its potential as a good anti-bacterial tool. The leaf extracts (methanol, ethanol, chloroform, and hexane aqueous) of *J. communis* were evaluated against five pathogenic multidrug resistant bacteria (*Erwinia chrysanthemi*, *Escherichia coli*, *Bacillus subtilis*, *Agrobacterium tumefaciens*, and *Xanthomonas phaseoli*), by using disc diffusion method. It has been estimated that all extracts of leaves of *J. communis* were effective against the pathogenic bacteria except aqueous extract. The hexane extract showed more activity as compared to other extracts (hexane > ethanol > methanol > chloroform extract). The methanolic extract of *J. communis* was found to be very effective as compared to standard antibiotics (ampicillin 10 mcg and erythromycin 15 mcg).

Test-tube and animal studies show that juniper berries have powerful antibacterial and antifungal properties. These are attributed to potent compounds in their oil, including sabinene, limonene, myrcene, and alpha- and beta-pinene. In one test-tube study, juniper berry essential oil demonstrated antibacterial and antifungal effects against 16 species of bacteria, yeasts, yeast-like fungi, and dermatophytes, a type of fungus that grows on your skin, causing diseases like ringworm. The strongest fungus-killing activities occurred against dermatophytes, as well as *Candida* species, which cause fungal infections like mouth and yeast infections. Another test-tube study found that juniper berry essential oil significantly inhibited the activity of three bacteria that can cause serious infections in humans — *M. gordonae*, *M. avium*, and *M. intracellulare*. Extract from the berries also may have antibacterial effects against many bacteria, including *Campylobacter jejuni*, which commonly cause food poisoning, and *Staphylococcus aureus*, a bacteria that may cause skin, lung, and bone. While it's clear that juniper berries have antibacterial and antifungal properties, human studies are needed to examine whether their extract can be used to treat fungal or bacterial infections in people.

G. Antimicrobial Activity of Abhal.

In accordance with researchers at Shiraz University of Medical Sciences, juniper berry fights both gram-negative as well as gram-positive bacteria. Gram-negative bacteria are definitely the reason for *E. coli*, pneumonia and gonorrhea, whilst gram-positive bacteria cause *Staphylococcus aureus*. *S. aureus* is a very common infection that individuals get in hospitals and it's also frequently resistant to anti-biotics; you've probably heard it known as MRSA.

Since pharmaceuticals are frequently ineffective at dealing with MRSA, juniper berry happens to be an effective option to assist combat bacterial infections.

The berries of *J. communis* were reported to have antimicrobial activity and volatile oils were analyzed by GC-FID and GC-MS. Its oil was investigated for its antimicrobial activity and the activity was tested against *Escherichia coli*, *Staphylococcus aureus*, *Hafnia alvei*, and *Pseudomonas aeruginosa*. DMF solution with three different concentrations of essential oil (1, 3, and 5mg/mL) was prepared which were applied on disc for the measurement of the diameter of the zone of inhibition around the disc. The chromatographic analysis of the essential oil of *J. communis* allowed identifying 41 components which represent 96% of the oil total composition (Table 3). The main chemical constituents in *J. communis* were α -cadinol (1.6%), α -pinene (36.2%), β -myrcene (21.1%), α -humulene (1.5%), *epi*- α -bisabolol (1.3%), germacrene D (2.2%), spathulenol (1.4%), and germacrene B (1.1%). The present study shows the chemical composition of *J. communis* from east part of Kosova. *J. communis* was active against *Escherichia coli*, *Staphylococcus aureus*, and *Hafnia alvei* except *Pseudomonas aeruginosa* which is resistant to *J. communis*.

H. Antifungal Activity of Abhal.

The aerial parts of *J. communis* were isolated by hydrodistillation for their essential oil with 0.1 and 0.3% yield. The oils were then tested for their antifungal (in vitro) activity against two fungi, *Rhizoctonia solani* and *Rhizopus stolonifer*. The essential oils obtained from *J. communis* showed antifungal activity against both fungi: *J. communis* (EC₅₀: 0.554 and 0.704mg/mL). The antifungal activity of *J. communis* is mainly due to the presence of high content of oxygenated monoterpenes.

I. Antimalarial Activity of Abhal.

The leaves and twigs (stems) of eight plants were isolated for their essential oil by hydrodistillation method (*Juniperus communis*, *Artemisia vulgaris*, *Myrtus communis*, *Lavandula angustifolia*, *Eucalyptus globulus*, *Rosmarinus officinalis*, *Origanum vulgare*, and *Salvia officinalis*) and were analyzed by GC-FID and GC-MS. The Essential oil obtained from these plants was then tested for their antimalarial activity on *Plasmodium falciparum*. There were two strains of *Plasmodium falciparum*: FcBI Columbia and a Nigerian chloroquine-sensitive strain. Two Concentrations ranged from 150 μ g/mL to 1mg/mL showed 50% inhibition of the growth of the parasite (in vitro) and The effect was obtained after 24 and 72 h. *Myrtus communis* and *Rosmarinus officinalis* oils at a concentration ranged from 150 to 270 μ g/mL showed best result against *Plasmodium falciparum*.

J. Antihypercholesterolemic Activity of Abhal.

J. communis fruit oil has been evaluated for its antihypercholesterolemic activity. The biochemical parameters and the histopathologic effects on kidney tissue were evaluated. Healthy Wistar albino rats of 200–250 gm in weight were used for this study. The rats were divided into 5 groups; first group is control group in which the animal was fed with normal pellet chow. The second group is cholesterol group which was fed with pellet chow containing 2% of cholesterol, and the third group is *J. communis* (JCL) group which was further divided into three subgroups 50 JCL, 100 JCL, and 200 JCL groups which were fed with 50, 100, and 200mg/kg *J. communis* oil, with addition to the 2% cholesterol-containing pellet chow. JCL was administered by a gavage needle (dissolved in 0.5% sodium carboxy methyl cellulose (SCMC)). After 30 days blood and kidney tissue samples were taken and biochemical estimation and histopathological investigation were done. The 200mg/kg JCL group showed a significant increase in blood urea nitrogen (BUN) and creatinine levels. The cholesterol group showed a significant increase in Ox-LDL levels. When the cholesterol was given along with 200mg/kg *J. communis* then there was no significant increase in the level of Ox-LDL. So the study showed its antihypercholesterolemic effect.

K. Anticataleptic Activity of Abhal.

Anticataleptic study was carried out to evaluate the effects of methanolic extract of *J. communis* (MEJC) leaf in reserpine induced catalepsy in rats. Catalepsy was induced by intraperitoneal (i.p.) administration of reserpine (2.5 mg/kg, i.p.). The methanolic extract at 100 and 200mg/kg (i.p.) was screened for its efficacy against reserpine induced catalepsy in rats. The MEJC extract was found to reduce catalepsy significantly ($P < 0.001$) as compared to the Reserpine treated rats; maximum reduction was observed at a dose of 200mg/kg.

L. Neuroprotective Activity of Abhal.

Neuroprotective activity of *J. communis* (MEJC) was evaluated in chlorpromazine (CPZ) induced Parkinson's model in rats. The two doses (100 and 200mg/kg, i.p.) have been selected on the basis of lethal dose (LD50) in mice. The plant was evaluated for various behavior parameters like catalepsy (bar test), muscle rigidity (rot rod test), and locomotor activity (actophotometer) and its effect on biochemical parameters (TBARS, GSH, nitrite, and total protein) in rats brain. *J. communis* showed a significant ($P < 0.001$) neuroprotective effect of MEJC against CPZ induced Parkinson's like symptoms or anti-Parkinson's activity.

M. Anti-Menstrual cramps activity of Abhal

Menstrual cramps are sometimes probably the most problematic facets of a woman's life, however these may also be decreased considerably with the aid of the juniper berry. Some herbalists make use of the juniper to enhance the uterus tone and to help those who have slow or even late starting periods.

N. Prevent Brain Disorders Abhal

A healthy brain is extremely important for the smooth functioning of various portions of the body. In case your brain gets afflicted with any disease, it not just affects the brain, but additionally a few of the other parts of the body. Juniper berries assist in keeping the brain fit and free of seizures as well as other such afflictions.

O. Contraceptive activity of Abhal

Women of conception age from particular tribes utilize the juniper berry like a contraceptive. Pregnant women are motivated not to consume juniper berry since it can easily stimulate uterine contractions.

9. Conclusion

The extensive literature survey revealed that *J. communis* L. is an important medicinal plant due to its traditional Uses to treat diseases and presence of many active chemical constituents which are responsible for various medicinal and pharmacological properties. Further evaluation needs to be carried out on *J. communis* L. in order to confirm its medicinal uses and development of formulations containing this plant for their practical clinical applications, which can be used for the welfare of mankind. Plant contains 4-terpineol (18.14%), marpol (7.96%), α -pinene (6.96%), γ -terpinene (4.46%), β -fenchyl alcohol (1.53%) and oploponone (0.69%) are major constituents. As per literature, sabinene (48.8%), α -pinene (6.2%) and endofenchyl acetate (5.8%) are major components of the essential oil from needles of *J. communis* growing in nature. Fruit yields 0.8 – 1.2% essential oil and 8% resin. It also contains the bitter substance juniperin.

Juniperus communis L. (Abhal) is an evergreen aromatic shrub with high therapeutic potential in human diseases. This plant is loaded with nutrition and is rich in aromatic oils and their concentration differ in different parts of the plant (berries, leaves, aerial parts, and root). The fruit berries contain essential oil, invert sugars, resin, catechin, organic acid, terpenic acids, leucoanthocyanidin besides bitter compound (Juniperine), flavonoids, tannins, gums, lignins, wax, etc. Conventionally the plant is being potentially used as antidiarrhoeal, anti-inflammatory, astringent, and antiseptic and in the treatment of various abdominal disorders.

References:

1. V. Tandon, B. Kapoor, and B. M. Gupta, "Herbal drug research in India: a trend analysis using IJP as a marker (1995–August2003)," *Indian Journal of Pharmacology*, vol. 36, no. 2, pp. 99–100, 2004.
2. Steven D. Ehrlich; NMD, *Solutions Acupuncture, a Private Practice Specializing in Complementary and Alternative Medicine*, Steven D. Ehrlich, NMD, Healthcare Network, Phoenix, Ariz, USA, 2009.
3. A. M. L. Seca and A. M. S. Silva, "The chemical composition of the *Juniperus* Genus (1970–2004)," in *Recent Progress in Medicinal Plants*, vol. 16 of *Phytomedicines*, pp. 402–522, 2005.
4. N. Gumral, D. D. Kumbul, F. Aylak, M. Saygin, and E. Savik, "Juniperus communis Linn oil decreases oxidative stress and increases antioxidant enzymes in the heart of rats administered a diet rich in cholesterol," *Toxicology and Industrial Health*, 2013.
5. D. Modnicki and J. Łabędzka, "Estimation of the total phenolic compounds in juniper sprouts (*Juniperus communis*, Cupressaceae) from different places at the kujawsko-pomorskie province," *Herba Polonica*, vol. 55, no. 3, 2009.
6. H. Tunon, C. Olavsdotter, and L. Bohlin, "Evaluation of anti-inflammatory activity of some Swedish medicinal plants. Inhibition of prostaglandin biosynthesis and PAF-induced exocytosis," *Journal of Ethnopharmacology*, vol. 48, no. 2, pp. 61–76, 1995.
7. M. A. Abbassy and G. I. Marei, "Antifungal and chemical composition of essential oils of *J. communis* and *Thymus vulgaris* against two phytopathogenic fungi," *Journal of Applied Sciences Research*, vol. 9, no. 8, pp. 4584–4588, 2013.
8. S. Banerjee, A. Mukherjee, and T. K. Chatterjee, "Evaluation of analgesic activities of methanolic extract of medicinal plant *Juniperus communis* Linn," *International Journal of Pharmacy and Pharmaceutical Sciences*, vol. 4, no. 5, pp. 547–550, 2012.
9. Manvi and G. P. Garg, "Screening and evaluation of pharmacognostic, phytochemical and hepatoprotective activity of *J. communis* L. Stems," *International Journal of Pharma and Bio Sciences*, vol. 1, no. 3, 2010.
10. S. Banerjee, H. Singh, and T. K. Chatterjee, "Evaluation of anti-diabetic and anti-hyperlipidemic potential of methanolic extract of *Juniperus Communis* (L.) in streptozotoc in nicotinamide induced diabetic rats," *International Journal of Pharma and Bio Sciences*, vol. 4, no. 3, pp. P10–P17, 2013.
11. S. Pepeljnjak, I. Kosalec, Z. Kalodera, and N. Blažević, "Antimicrobial activity of juniper berry essential oil (*Juniperus communis* L., Cupressaceae)," *Acta Pharmaceutica*, vol. 55, no. 4, pp. 417–422, 2005.
12. M. Hoferl, I. Stoilova, E. Schmidt et al., "Chemical composition and antioxidant properties of Juniper Berry (*J. communis* L.) Essential oil. Action of the essential oil on the antioxidant protection of *Saccharomyces cerevisiae* model organism," *Antioxidants*, vol. 3, no. 1, pp. 81–98, 2014.
13. M. Akdogan, A. Koyu, M. Ciris, and K. Yildiz, "Anti-hypercholesterolemic activity of *J. communis* Oil in rats: a biochemical and histopathological investigation," *Biomedical Research*, vol. 23, no. 3, pp. 321–328, 2012.
14. S. C. Sati and S. Joshi, "Antibacterial potential of leaf extracts of *Juniperus communis* L. from Kumaun Himalaya," *African Journal of Microbiology Research*, vol. 4, no. 12, pp. 1291–1294, 2010.
15. S. Bais, S. Gill, and N. Rana, "Effect of *J. communis* extract on reserpine induced catalepsy," *Inventi Rapid: Ethnopharmacology*, vol. 2014, no. 4, pp. 1–4, 2014.

16. S. Vichi, M. Riu-Aumatell, M. Mora-Pons, J. M. Guadayol, S. Buxaderas, and E. L'opez-Tamames, "HS-SPME coupled to GC/MS for quality control of *Juniperus communis* L. berries used for gin aromatization," *Food Chemistry*, vol. 105, no. 4, pp. 1748–1754, 2007.
17. P. K. Sharma and B. Lal, "Ethnobotanical notes on some medicinal and aromatic plants of Himachal Pradesh," *Indian journal of Traditional Knowledge*, vol. 4, no. 4, pp. 424–428, 2005.
18. A. K. Nandkarni, *Indian Materia Medica*, Popular Prakashan Private Limited, Bombay, India, 1976.
19. N. R. Farnsworth, "Biological and phytochemical screening of plants," *Journal of Pharmaceutical Sciences*, vol. 55, no. 3, pp. 225–276, 1966.
20. E. Lamer-Zarawska, "Phytochemical studies on flavonoids and other compounds of juniper fruits," *Polish Journal of Chemistry*, vol. 54, no. 2, pp. 213–219, 1980.
21. A. Hiermann, A. Kompek, J. Reiner, H. Auer, and M. Schubert- Zsilavec, "Investigation of flavonoid pattern in fruits of *Juniperus communis* L.," *Scientia Pharmaceutica*, vol. 64, no. 3-4, pp. 437–444, 1996.
22. M. Kowalska, "Chemical composition of common juniper (*J. communis* L.) fruits," *Roczniki Akademii Rolniczej w Poznaniu*, vol. 117, pp. 61–64, 1980.
23. E. Lamer-Zarawska, "Flavonoids of *J. communis* L.," *Roczniki Chemii*, vol. 51, no. 11, pp. 2131–2137, 1977.
24. M. Ilyas and N. Ilyas, "Biflavones from the leaves of *J. communis* and a survey on biflavones of the *Juniperus* genus," *Ghana Journal of Chemistry*, vol. 1, no. 2, pp. 143–147, 1990, (CA252113p, 1991, vol. 115).
25. Anonymous. *The wealth of India*. Vol V. New Delhi: NISCIR; 2003: 133-135.
26. Rezwani S, Rezai M A, Mahmoodi N. Analysis and antimicrobial activity of the plant *Juniperus communis*. *Rasayan I. Chem* Vol.2, No.2 (2009), 220-29
27. A Snafi A.E. medical importance of *Juniperus communis*- a review *IAJPS* 2018, 05 (03), 1299-1312
28. Bhattacharjee SK. *Handbook of medicinal plants*. 4th revised edition. India: Pointer publications; 2004: 1920-97.
29. Prajapati ND, Kumar U. *Agro's dictionary of medicinal plants*. India: Agrobios; 2005: 130.
30. Razi ABZ. *Kitabulabdal*. New Delhi: CCRUM; 2000: 8, 34.