



Abhal (*Juniperus communis* L.): Beneficial Drug for Urogenital System - A Review

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ABSTRACT

Abhal (*Juniperus communis* L.) belonging to the family *Cupressaceae* is an evergreen, aromatic shrub, native to Europe, South Asia, and North America and used as medicine since 70 AD when Dioscorides introduced it first. The blackish red berry like fruits are known as Abhal in Unani System of Medicine. It is mainly used as diuretic, lithotriptic, anti-inflammatory, emmenagogue, demulcent, mild astringent, and anthelmintic. *Juniperus communis* L. contains volatile oils, acids, flavonoids, tannins and many more compounds. The diuretic effect of juniper is thought to be due to sesquiterpene hydrocarbons present in it. Various pharmacological studies on *Juniperus communis* L. exhibit e.g. diuretic, carminative, stimulant and abortifacient properties as well as direct effect on smooth muscle contraction.

Keywords: Berry, diuretic, juniper, lithotriptic, flavonoids.

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INTRODUCTION

Various plants have been used from ancient times as primary sources to treat several ailments and Unani System of Medicine which is one of the oldest, richest and most deserving therapy has a lot of herbs in its repository. Many single and compound formulations are available which include crude herbs as important medicine. Abhal (*Juniperus communis* L.) belongs to family *Cupressaceae*, is one of the drug obtained from plant source. It is an evergreen, aromatic shrub, native to Europe, South Asia, and North America. ¹ It has been widely used as herbal medicine from ancient time. Dioscorides (70 AD) introduced its medicinal properties 1st time in his book *De Materia Medica*. ² It has green needle like leaves in whorls of three, with a single white stomatal band on the inner surface. The fruits which are used medicinally are berry like cones, initially green which ripe to purple black with a blue wax coating. ³ In Unani System of Medicine the small blackish red fruit of a size of *Jangli Ber* (wild jujube fruit), are internally taken for the treatment of various diseases from urogenital system e.g. cystitis, urolithiasis, amenorrhea, retention of urine etc. and also used to cure various cold diseases e.g. Paralysis, nerve weakness, asthma etc. Externally it is used for

inflammatory conditions and various skin ailments^{4,5,6} which are attributed to the chemical constituents like monoterpene, sesquiterpene, essential oil and volatile oil, wide range of phenolic compounds and many other chemical presents in it. ⁷ However it has many therapeutic properties but, the diuretic and emmenagogue properties make it an effective drug for urogenital system. Due to the same properties it may cause abortion, so it is contraindicated in pregnancy and also harmful for kidney. So precaution must be taken during use of this drug. This review has been compiled with special emphasis on single use and in the form of compound formulations along with its pharmacological studies relevant to Unani System of Medicine.

Distribution

The plant grows in Europe South-western Asia, and North America. In Asia the plant grows naturally in Western Himalayas from Kumaon westwards to Srinagar at 1700–4200 m and found at an altitude of 3000-4000m from Afghanistan to South-west China. ^{7,8,9}

Botanical description

Juniperus communis L. is an evergreen, aromatic shrub, belongs to family *Cupressaceae*. It has green needle like leaves in whorls of three with a single white stomatal band on the inner surface. It is dioecious with male and female cones which are wind pollinated on separate plants. The fruits are berry like cones initially green which ripen in 18 months to purple black with a blue wax coating. These berries are spherical 4-12mm in diameters and usually have three fleshy fused scales, each scale with a single seed. The male cones are yellow 2-3mm in length and fall soon after shedding their pollen. ¹⁰





Figure 1: showing illustration (a), shrub (b&c), stem & leaves (d), fresh & dried berries (e&f).

Scientific classification

Kingdom: Planta

Division: Pinophyta

Class: Pinopsida

Order: Pinales

Family: Cupressaceae

Genus: *Juniperus*

Species: *Communis*

Greek: Barathi, Arqulas

Gujarati: Palash

Hindi: Hauber, Huber, Hush

Italian: *Ginepro, ginepro commune*

Kannada: Padambija

Kashmiri: Vethur

Marathi: Hush

Persian: Tukhm Rahl, Adras, Saro Kohi

Punjabi: Hawlber

Portuguese: *Zimbreiro*

Roman: Barun, Barusun

Sindhi: Ahuber

Spanish: *Enebro, ginepro nano*

Suriyani: Barutha

Swedish: En

Telugu: Hapusha

Turkish: Aarduj

Urdu: Abhal

DESCRIPTION OF DRUG IN UNANI LITERATURE

The fruits (berries) are used in Unani system of medicine as *Abhal*. It is obtained from two sources one is small and second is big,¹¹ botanically they are *Juniperus communis* and *Juniperus sabina*. It is a small green fruit (berry) in a size of *Jangali Ber* (wild jujube fruit), which become blackish red when ripe and after drying its outer layer become shrink. It has sweet, astringent and mildly sharp taste and specific smell.^{5,11} It has various small, yellowish or reddish seeds. When the fruit is soaked in water, it absorbs it and become swell and gives a specific smell like tar coal. It is best if used before 2 years, after that it decomposes due to the intrusion of the insects^{5,6} In Unani System of Medicine the drug has been described as follows:

Mutaradifat (vernacular names)^{1,5,9}

Arabic: Habbul 'ar'ar, Jawzul 'ar'ar, Thamratul 'ar'ar

Assamese: Arar, Abahal

Bengali: Hyusha, Buber

English: Common Juniper

French: *Genévrier, genièvre commun*

German: *Gemeine Wacholder, Heide-Wacholder*

Ajza-e-musta'mala (parts used): Fruits (berries) and leaves are used medicinally⁶ but if anywhere it is mentioned as *Abhal* then it means the berries.⁴

Mizaj (temperament): Hot and dry in 2nd degree,^{5,6} Galen has mentioned it in 3rd degree^{4,11}

Naf'a Khas (main action): *Abhal* berries are very effective for urogenital problems e.g. amenorrhea and retention of urine⁵

Af'al (action): Berries (*Abhal*) have *Kasir-i-reyah* (carminative), *Mudirr-i-bawl* (diuretic), *Muhallil* (anti-

inflammatory), *Mudirr-i-hayd* (emmenagogue), ¹² *Jali* (detergent), *Mufattih Sudad* (deobstruent), *Mujaffif* (desiccant), *Mulattif* (demulcent), *Muqawwi-i-mi'da* (stomachic), *Qabid Khafif* (mild astringent), *Shahwat Angez* (aphrodisiac), *Dafi' Zakawat-i-His* (useful in hyper sexuality), *Laze'* (irritant), *Qatil Kirm Shikam* (anthelmintic), *Musaqit-i-Janeen* (abortifacient) properties. ^{5,6,11} Leaves are used for fumigation. ⁶

Iste'malat (uses): Due to its *Muhallil*, *Mulattif* and *Mufattih* actions it has been used for the treatment of *Falij* (hemiplegia), *Sarsam Har* (acute meningitis), *Istirkha-i-'asab* (flaccidity of nerves), *Intisab-i-tanaffus* & *Ribu* (orthopnea and asthma), *Istisqa* (ascites). Due to its antiseptic and anti-inflammatory properties, it removes putrefaction, heals chronic wound and resolves acute inflammations. ¹¹ *'Usr-i-tanaffus* (difficulty in breathing), etc. For stomach problems it is used as *Kasir-i-reyah*, *muqawi-i-mi'da*, and *Qabid* (astringent) and is also used for the treatment of *Ishal-i-mi'di* or *Sangrahni* (IBS), *Qrooh-i-shikam*. It is very useful drug for *amraz-i-gurda wa mathana* (renal and bladder diseases), renal suppression (scanty micturition), catarrh of the bladder, albuminuria etc. It is one of the most useful drug of Unani System of Medicine, especially used for amenorrhea, as it initiates menses due to its emmenagogue property. It removes *Safra* (yellow bile), *Sawda* (black bile) and *Balgham* (phlegm) very slowly.⁴

METHOD OF ADMINISTRATION

Diseases of head, brain and nerve

It is used as *Dimad* in various type of inflammation. The paste of leaves are applied on head to cure *Sarsam* (meningitis) ^{4,11}

A drink from the decoction of its berries is useful for *Falij* (hemiplegia) and *Istirkha-i-'asab* (nerve weakness). ¹¹

Continuous use of *Abhal* berries gives relief in *Sara'* (epilepsy). ⁴

Diseases of Ear, Nose and Throat (ENT)

Warm juniper berry with Roghan Kunjad (linseeds oil) in an iron utensil, till *Abhal* turned black and then pour it into the ear, due to its *Mulattif* (demulcent) and *Mundij* (concoctive) properties, it will resolve the pain ¹³ and deafness. ^{5,11}

Diseases of teeth and gums

A gargle of its berries is used to strengthen the gums ¹¹

Diseases of lungs

The powder of its berries mixed with honey and ghee is used as *La'uaq* (linctus) for the treatment of *Ribu* (asthma), as it cures *'Usr-i-Tanaffus* (difficult breathing) ^{5,11}

Diseases of GIT

The powder of its berries mixed with honey and ghee is used as *La'uaq* (linctus) for the treatment of *Bawaseer* (haemorrhoids) ¹¹

Due to stomachic and carminative properties it is useful in *Amrad-i-mi'da* e.g. *Qaraqar Shikam* and due to its mild astringent property it is also useful for *Zarab* and *Sangrahni* (irritable bowel syndrome). ⁵

Due to the diuretic activity, it is found effective in *Istisqa-i-Zaqi* (ascites). ⁵

It is warm and irritant so the internal use kills the helminthes and expels them. ⁵

Diseases of hair, skin, inflammations and injuries

Extract obtained through dissolving the berries in vinegar is applied locally on *Da 'al-thalab* (*Alopecia areata*), this is a tested formulation which gives imminent effect. ¹¹

Due to its detergent action, if applied locally, it cleans skin and dark patches. ¹¹

Due to its resolving property it is applied locally on inflammations ⁵

Due to its *Mujaffif* and *Jali* properties it is used as *tila* (liniment) and *zroor* (powder) in *qrooh-i-saila* (spreading ulcer) and *qruh-i-ufuna muzmina* (ch. septic ulcer). ¹³

Diseases of urogenital system

Due to its *Mulattif* (demulcent) and *Mufattih* (deobstruent) properties it produces diuretic effect which makes it useful, if taken internally in *Ihtibas-i-bawl* (urinary retention), *Ihtibas-i-hayd* (amenorrhea), ⁵ *muzmin warm-i-kuliya* (chronic nephritis), *muzmin suzak* (chronic gonorrhoea), *sang-i-gurda* (renal calculus), and *sang-i-mathana* (vesical calculus).

10 gm powder of its berries with honey is taken as *La'uaq* (linctus) to induce menses. ¹⁴ Its powder is also useful in gonorrhoea ⁴

MAZARRAT (ADVERSE EFFECT AND TOXICITY)

It is contra indicated in pregnancy due to *Musqit-i-janin* (abortifacient), effect and also harmful for stomach and throat. ¹¹ It causes headache and decreases volume of semen. It is severe diuretic and excess use can cause *Bawlud Dam* (uremia) and contraindicated in acute renal diseases. ^{6,12,13} Juniper berry may increase glucose levels in diabetics. Terpinen-4-ol of the volatile oil increases the fluid-filtering rate of the kidneys. (1.85 mg/kg orally was found toxic in mice). ^[8] Hot temperament person should avoid the use of this drug because it produce harmful effect on liver. ⁴

MUSLEH (Corrective): Honey, *Roghan-i-Zard* (ghee), and *Zarishk* (*Berberis vulgaris*) is coregent for throat, and stomach complications. *Gil-i-Armani*, *Khulanjan* (*Aplinia galanga*), *Hamama*, *Narmushk* (*Mesua ferrea*) or *Zarishk* is used as corrective for the complications of liver, uremia and fear of abortion⁴ *Kishniz Khushk* (*Coriandrum sativum*, seeds), *Nabat Safed* (sugar) are used as correctives. ^{6,11}

BADAL (Substitute): *Barg-i-Sudab* (*Ruta graveolens*), ⁵ *Zeera Safed* (*Carum curvi*) or *Kalonji* (*Nigella sativa*) is used as substitute for *Idrar-i-Bawl* (diuresis). Cinnamon, twice in



the quantity is served for the same purpose as Abhal does.
6,12,13

MIQDAR KHURAK (Dose): 3-5gm (berries)^{5,6}

MURAKKABAT (Compound Formulations): *Dawa-i-Mudirr-i-hayd, Ma'jun Jograj Gugul, Ma'jun Musakkin Waja-ur-Raham, Ma'jun Mudirr-i-Hayd, Ma'jun Mudirr-i-Tamth,*⁵ *Ma'jun Suhag Sonth,*¹⁵ *Roghan Abhal, Sharbat-i-Mudirr-i-Hayd. Sharbat Mudirr-i-Tamth,*⁵ *Safuf Moya,*¹⁶ *Sharbat Mudir,*² *Taryaq Afiyun* etc.¹⁷ (See table 1 for detail).

BIOACTIVE COMPOUNDS

Juniper contains over 60 compounds (Table 2), which include small quantities or traces of several sesquiterpene hydrocarbons (with strong diuretic properties). It contains

various chemical constituents including flavonoids, volatile oil and coumarins.

Leaves contain the cupressuflavone, hinokiflavone, biflavone, isocryptomerinamentoflavone, sciadopitysin; berries contain apigenin, rutin, luteolin, quercetin-3-O-arabinosyl-glucoside, quercetin-3-o-rhamnoside quercitrin, scutellarein, nepetin, amentoflavone, and bilobetin. Diterpenes, catechin tannins, potassium salts, inverted sugar (20- 30%), flavonoids and condensed tannins are also present in the berry. The berries gave a diterpene ketone, sugrol, beta-sitosterol glucoside and 10-nonacosanol; seeds contain haemagglutinin. Juniper camphor is also present, its melting point being 1.65-1.66° C.^{7,8} Methanolic extract of the plant gave several labdane diterpenoids and diterpenes.

Table 1: Compound formulations of *Abhal* with their dose action and indication

S.N	Name of compound formulation	Dose and mode of administration	Action	Indication
01	<i>Dawa-i-Mudirr-i-Hayd</i> ⁹	5 gm/orally	Emmenagogue	Secondary amenorrhoea
02	<i>Habb-i-Masqit-i-Hamal</i> ⁹	5 to 10 gm/orally	Abortifacient	For expulsion of foetus
03	<i>Ma'jun Jograj Gugul</i> ¹⁶	3-5g/orally with any vehicle	Nerve tonic, aphrodisiac	Hemiplegia, bell's palsy, chorea, syphilis, rheumatism
04	<i>Ma'jun Suhag Sonth</i> ¹⁵	10 g/orally	Uterine tonic, antiseptic	Uterine weakness, general weakness, especially in gynecological disorders.
05	<i>Safoof Moya</i> ¹⁶	1-2gm/orally with water	Antidiarrheal	Chronic diarrhea
06	<i>Taryaq Afiyun</i> ¹⁷	2-3 gm/orally	Antidote	Opium poisoning

Table 2: Various chemical compounds of *J. communis*¹⁸⁻²³

S.N	Group of the compound	Name of the compound
01.	Acids	Diterpene acids, ascorbic acid and glucuronic acid
02.	Flavonoids	Amentoflavone, quercetin, isoquercitrin, apigenin and various glycosides
03.	Tannins	Proanthocyanidins (condensed), gallo catechin and epigallocatechin
04.	Volatile oils	The major constituents of the volatile oil are alpha-pinene, sabinene and alpha-terpinene. 0.2–3.42%. Primarily monoterpenes (about 58%) including a-pinene, myrcene and sabinene (major), and camphene, camphor, 1,4-cineole, p-cymene, a- and g-cadinene, limonene, b-pinene, g-terpinene, terpinen-4-ol, terpinyl acetate, a-thujene, borneol; sesquiterpenes including: caryophyllene, epoxy dihydro caryophyllene and b-elemem-7a-ol. Geijerone (C12 terpenoid), characterised as trans-isopropenyl-4-methyl-4-vinylcyclohexanone has also been isolated from the essential oil.
05.	Other constituents	Junionone (monocyclic cyclobutane monoterpenoid), desoxypodophyllotoxin (lignan), resins and sugars.

PHARMACOLOGICAL STUDIES

Active principles exhibit diuretic, carminative, stimulant, antidropsical, anti-leucorrhoeic, and abortifacient properties of the berry and its volatile oil. Animal studies have shown an increase in urine excretion as well as direct effect on smooth muscle contraction.⁸ Various pharmacological studies on Juniper is given below:

Neuroprotective effects

It has been reported that methanolic extract possessed a therapeutic effect in reserpine-induced animal model for Parkinson disease. Similarly, the plant extract was also reported to possess significant neuroprotective effect against chlorpromazine-induced Parkinson like symptoms. The inhalation of volatile oil at the rate of 1% or 3% daily for 21 days also to improve amyloid β induced memory deficits in rat model of Alzheimer disease and was found



Acetylcholine inhibition (AChE) activity involved in the progression of neurolog-esterase activity and prevent oxidative damage in brain of rodents in a dose dependent manner due to its significant antioxidant potential and ability to inhibit AChE activity involved in the progression of neurological disorders.²⁴ In another study neuroprotective activity of methanolic extract of *J. communis* (MEJC) was evaluated in chlorpromazine (CPZ) induced Parkinson's model in rats. Various behavior parameters like catalepsy (bar test), muscle rigidity (rota rod test), locomotor activity (actophotometer) and its effect on biochemical parameters (TBARS, GSH, nitrite, and total protein) in rats brain was observed in which Methnolic extract of *J. communis* showed a significant ($P < 0.001$) neuroprotective effect.²⁵

Gastrointestinal effects

The anti-ulcer property of *Juniperus communis* was studied in acetyl salicylic acid, serotonin, indomethacin, alcohol and stress-induced gastric ulcerations in rats and histamine-induced duodenal lesions in guinea pigs. The crude leaf extract at doses of 50 mg and 100 mg/kg, ip, significantly inhibited aspirin, serotonin, indomethacin, alcohol and stress-induced gastric ulcerations in rats and histamine-induced duodenal lesions in guinea pigs. The healing rate of acetic acid induced ulcer in rats was also enhanced significantly by the leaf extract. Biochemical analysis of gastric juice revealed that the extract significantly decreased its volume and total acidity, but did not alter its pH and peptic activity.²⁶

Hepatoprotective Activity

The ethyl acetate fraction of juniper leaves was investigated for its hepatoprotective effect in paracetamol induced hepatic damage in albino Wistar rats. This fraction treated group of rats shown remarkable decrease in the elevated levels of serum aspartate and alanine aminotransferase, alkaline phosphatase and direct bilirubin and total bilirubin as compared to untreated hepatotoxic rats.²⁷ The combination of ethanolic fruits extract of *Solanum xanthocarpum* and *Juniperus communis* was evaluated against combine oral administration of paracetamol (PCM) [250 mg/kg] and azithromycin (AZM) [200 mg/kg] for 7 days in Wistar rats. Fruit extract of *Solanum xanthocarpum* [200 and 400 mg/kg] and *Juniperus communis* [200 and 400 mg/kg] were administered daily for 14 days. A combine administration of AZM and PCM significantly produced liver toxicity by increasing the serum level of hepatic enzymes, oxidative parameters in liver, and histopathological. Chronic treatment of SX and JC extract significantly and dose-dependently attenuated the liver toxicity by normalizing the biochemical factors and histopathological changes in rats.²⁸

The hepatoprotective activity of *J. communis* was determined in carbon tetrachloride (CCl₄) induced hepatotoxicity in rat model. Administration of ethanolic and aqueous extracts of *J. communis* berries shown reduction in the elevated serum levels of hepatic damage biomarkers

viz. aspartate and alanineaminotransferase, alkaline phosphatase and bilirubin.²⁹

Antidiabetic and Anti-hyperlipidemic Activity

J. communis was reported to have antidiabetic and anti-hyperlipidemic activity in streptozotocin (STZ) nicotinamide induced diabetic rats. Methanolic extract of *J. communis* (100 mg/kg and 200 mg/kg p.o.) was administered except to the group that received (glibenclamide 10 mg/kg). Biochemical estimation and fasting blood glucose levels were estimated on 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 anti-hyperlipidemic activity.³⁰

Anti-Inflammatory Activity

Anti-inflammatory activity of *J. communis* fruit extract has determined using isolated cells and enzymatic test. The plant showed varying degree of activity at 0.2 mg/mL in prostaglandin test and 0.25 mg/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.³¹

Analgesic Activity

Banerjee *et al.* reported the analgesic activity of methanolic extract of *J. communis* [100 mg/kg and 200 mg/kg]. Acetylsalicylic acid was used as standard (100 mg/kg). In vivo the extract was evaluated by different tests like formalin test, acetic acid induced writhing, and tail flick tests. In the study *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 (2 mg/kg i.p.) confirms the central analgesic activity. The plant showed significant anti-nociceptive activity and it has been established that the methanolic extract of *J. communis* acts both peripherally and centrally.³²

Antioxidant Activity

The in vitro antioxidant activity of plant oil using different assays like DPPH scavenging, superoxide scavenging, ABTS radical cation scavenging, and hydroxyl radical scavenging has been reported by previous study. 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.³³

Water and ethanol extracts of *Juniperus communis* fruit was evaluated in vitro using different antioxidant assays, including reducing power, free radical scavenging, superoxide anion radical scavenging, hydrogen peroxide scavenging, and metal chelating activities. Both the extracts



exhibited strong total antioxidant activity. The concentrations of 20, 40, and 60 µg/ml of water and ethanol extracts of juniper fruit showed 75%, 88%, 93%; 73%, 84%, and 92% inhibition on peroxidation of linoleic acid emulsion, respectively. Both extracts of juniper possessed effective reducing power, free radical scavenging, superoxide anion radical scavenging, hydrogen peroxide scavenging, and metal chelating activities at these same concentrations [20, 40, and 60 µg/ml].³⁴

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