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Review Article

Kaiphal (*Myrica nagi*): A Botanical Origin Drug (*Dawa*) of Unani Medicine for Prevention and Treatment of Common Disorders

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Abstract

Myrica nagi is a celebrity medicinal plant that is distributed in sub-Himalayan regions and holds several pharmacological actions and therapeutic effects along with their economic usage. In Unani System of Medicine (USM), it is well known, as *Kaiphal* and used in the prevention and the management of several common disorders *viz. Amraz-i-Riya* (Respiratory disease), *Amraz-i-Hazam* (Gastrointestinal disease), *Amraz-i-Aasab* (Nervine disease), and *Amraz-i-Bawl* (genitourinary disease). Recent clinical studies evaluate that the *Kaiphal* consist of numerous phytoconstituents *viz.* tannins, flavonoids, phenolic acids, terpenes, glycosides, amino acids, steroids, and volatile oils. These phytoconstituents are responsible for varieties of pharmacological actions *viz.* Anti-inflammatory, Anti-Oxidant, Anti-Allergic, Anti-helminthic, Neuroprotective, Nephroprotective, Anti-hypertensive, Anticancer, and Anxiolytic. Conventionally, different parts of *Kaiphal* are used in asthma, allergic disorder, inflammatory diseases, neurological disorders, renal disease, and cancer. The physicians of USM described properties and therapeutics uses of *Kaiphal* but data on safety and efficacy are limited and also lack of attraction of researcher toward a preclinical and clinical trial. Therefore, this review updated the knowledge about pharmacological and therapeutic effects, ethnomedicinal uses, adverse effects, prevention and treatment of common disorders and also focused on future research in the prospective era.

Keyword: *Kaiphal*, *Myrica nagi,* USM, Phytoconstituents, Asthma

1. INTRODUCTION

Traditional medicine are used to cure almost all ailments of mankind through natural product since the distant past. In present era, herbal medicine attract whole world for prevention and therapeutic measurs of numerous popular disorders at a level of primary health care due to their minimum adverse events and local availibility. According to WHO (World Health Organisation), 80% population daily used traditional medicine including Unani, Ayurveda, Homeopathy, Yoga, Siddha, Persian medicines and Chines medicines [1]. *Myrica nagi* is a plant of myricaceae family and came under genus of Myrica, and approximately 97 species lies in this genus. The plants of this family are native to subtropical and temperate region of the earth [2]. *Myrica nagi* is well known, as *Kaiphal*, *Kathphala* and Boxberry and for their medicnal properties in traditional medicine [3]. *Kaiphal* is a medium size dioceous tree upto 15 meter height that habitate in sub-tropical Himalayas [4]. Versatile and economical medicinal use of *kaiphal* make it unique and seek attention of locality as well as researcher [3]. The *Kaiphal* fruits have pleasant taste and edible in several regions of India *viz*. Meghalaya and sub-Himalayan with their nutritional and therapeutic importence. They are used to manufacture several products likes syrups, jams, pickles, and refreshing drinks. It also great sources of Vitamin C, and polyphenolic compounds. All parts of this tree *viz*. fruits, bark, roots, and leaves have their nutritional and therapeutic importance and also used in traditional medicine [3,4]. Based on scientific investigation *viz*. pharmacogonosy and HPTLC (High-performance thin layer chromatography) *Kaiphal* plant composed of numerous pharmacologically active substances *viz.* Myricetin, myricanol, myricanone, epigallocatechin myricitrin, myricanol, Myricanone, gallic acid, ethyl β-Dglucopyranoside, 4-methoxybenzoic acid, 3-hydroxybenzaldehyde, isovanillin, β-sitosterol, 4-(hydroxymethyl) phenol, and daucosterol which exhibits properties of anti-inflammatory, anti-oxidant, antihelmintic, antimicrobial, anxiolytic, Mast-cells stabilizing, antihypertensive, hepatoprotective, antibacterial, antifungal and anti-asthmatic [5,6].

USM originated from Greece with their deep scientific and philosophical concept in respect to disease and their management. The concept *Sahet* (health) and *Amraz* (disease) based on *Nazaria-i-Akhlat* (Theory of Humour) given by eminence Unani scholar named *Buqrat* (Hippocrates). According to him "Human body composed of four types of *Akhlat* (Humour) *viz. Dam* (Blood), *Balgham* (Phlegm), *Safra* (Yellow bile), and *Sauda* (Black bile). The health is a state of equilibrium while disease occurs due to imbalance between *Akhlat*". To restore health, managed body ailments in such a way that all humour became in equilibrium. For this, the way of management in USM includes *Ilaj bi'l-Ghiza* (Dietotherapy), *Ilaj bi'l-Tadbir* (Regimental therapy), *Ilaj bi'l-Dawa (*Pharmacotherapy*),* and *Ilaj bi'l-Yad* (Surgery) [7,8]. *Ilaj bi'l-Dawa* is the most popular one that includes medicine of

Nabatat (Plants), *Jamadat* (Minerals), or *Haiwanat* (Animal) origin that used in either in *Mufrad* (single) or *Murakkab* (Compound) form according to needs [9]. In USM, most of the drug came from *Nabatat* than *Zamadat* or *Haiwanat* and parts are uses *viz*. leaves, flower, fruits, barks, stems, roots and whole plants depends on varieties of plants, availibility of plants, and nature of *Amraz*. *Kaiphal* is a well renowned botanical origin drug of USM and its stem bark usually used by physicians since immemorial to prevent and cure numerous kinds of *Amraz* (diseases) *viz*. *Amraz-i-Dahen* (Oral Cavity disease) [10], and *Badbu-iDahen* (bad breath) [11-17], *Amraz-i-Nazam Asab* (Central Nervous system) [10,12,17], *Amraz-i-Jild* (Dermatological disorder) [10-14,17], *Amraz-i-Nizam Taam* (Gastrointestinal disease) [10,11,13,15,17], Ear Nose Throat (ENT) disease [11,14,17] *Amraz-i-Tanasuliya* (Reproductive disease) [11,17], and *Amraz-i-Tanaffus* (Respiratory disease) [12,14]. The pharmacological properties of *Kaiphal* described by Unani physician *viz*. *Muhalil* (Resolvent) [10-20], *Qabiz* (Astringent) [10,20], *Muqawwi-i-Asab* (Nerve tonic) [10-15,17,19], *Muharrik Asab* (Nerve stimulents) [20], *Daf-e-Taffun* (Antiseptic) [10,11,16,18,20], *Daf-i-Tasannuj* (Antispasmodic) [16,18,20], *Daf-i-Istirkha* [19], *Munaffis* (Expectorent) [10,12,13,16], *Muattis* (Sneezer) [10,12,13], *Mufatteh* (Deobstruents) [11,17,19], *Mulattif* (Demulcent) [17], *Habis al-dam* (Coagulant) [11], *Musakhkhin* (Calorific) [17], *Muzafif* (Dessication) [15,17,19], *Hazim* (Digestive) [16], *Musakkin awja* (Anti-inflammatory) [15] and *Kasir-i-Riya* (Carminative) [15,16].

Therefore, the properties and used of *Kaiphal* assorted but validity on scientific parameter still under proof or need of further assessment. In this review authors attempt to compile information realted to phytoconstituents, pharmacological activity, ethenomedicinal and conventional importence, and current published study.

2. MATERIAL AND METHODS

The literature on this well-known USM drug was gathered from renowned Unani medicine classic books, as well as some conventional books from the National Institute of Unani Medicine's library and internet books. Data on the well-known medicine *kaiphal* was also gathered from a variety of reputable and indexed journals, periodicals, accepted manuscripts, and other on-line sources.

3. RESULT AND DISCUSSION

3.1. Description of *Kaiphal* in USM

Kaiphal was described in USM as a 30 foot tall *khardar Darakht* (prickled tree) with a broad and straight stem. During Chait-Baisak (March to May), a new leaf appeared with a faint pleasant odour when crushed. *Kaiphal* is a tiny, elongated fruit with scarlet seeds in the centre that ripens during Baisakh (April to May). In USM, the stem bark is known as *Kaiphal*, and it is thick, hard, red in colour, harsh and astringent in taste, pleasant to smell, and contains color-like compounds [11,17].

Kaiphal is a small to moderate tree with a height of 3 to 15 metres in traditional medicine. It's a woody dioecious plant that looks alike both male and female plants. Leaf; the colour of a leaf is light green on the lower surface and dark green on the top surface, with a size of 0.09 x 0.03 m and a shape of lanceolate and obovate [6]. On a transverse section of a leaf made up of the epidermis (upper and lower) with one layer of polygonal cells covered by mucilaginous cuticle, vein termination (13–15) and vein islet are evident (9-11 in number) [21]. Each male flower has about 25 blossoms and 12 stamens, while the plant's inflorescence is a 4.2 cm long catkin [6]. Small, globular, seedy, pulpy drupes with a tough endocarp, the plant's fruits are small, globular, seedy, pulpy drupes with a tough endocarp [22]. The fruits of *Myrica nagi*, as well as its byproducts such as syrups, jams, and pickles, are edible and can help people in Meghalaya and the sub-Himalayan region make a living [21]. Seeds; the plant's seeds are triangular, 9 x 5 mm in size, 165 mg in weight, and have an astringent flavour [6,22]. The bark of the *Kaiphal* plant is delicate, brittle, and dark brown to blackish in colour [22,23]. Multilayer cork can be seen in a transverse section of mature bark, and the secondary cortex is made up of parenchymatous cells with starch grain. Rope and papper are made from bark as well [21].

3.2. Ethnomedicinal Uses of *Kaiphal*

3.2a. *Amraz-i-Dahen*

Manjan (Tooth Powder) made with *Kaiphal* is used to prevent and treat toothaches as well as to strengthen teeth, as well as to make *Warm Lissa* and *Lissa Damwiya* [11-16] and *Badbu-i-Dahen (*bad breath*). Kaiphal* Powder can be used on its own to treat toothaches and strengthen gums [11,17]. For *Dard-e-Asnan* (toothache) and *Qula* (stomatitis), gargle with *Kaiphal* stem bark decoction [10,12,13,14,17]. Before being employed in *Qula* as *Gargrah,* stem bark is boiled in a mixture of *Sharab* (alcohol), *Sirka* (vinegar), and water [17]. To prevent tooth decay, *Joshanda* (a decoction of stem bark) is also utilised [11].

3.2b. *Amraz-i-Nizam Asab*

Dalak (massage) with fine powder of *Kaiphal* (250 gm) burned in *Rogan-i-Kunzud* (Oil of *Sesamum indicum)* is used to treat a variety of neurological illnesses including *Faliz* (Paralysis), *Laqwa* (Facial paralysis), *Khidr* (Anesthetic), *Rasa (*Tremer), and *Waja* (Pain) [10,12-15]. *Kaiphal Tila* (liniment), a native application used in *Faliz* [17]. For consciousness, *Kaiphal's Niswar* (Quids; a chewing lump) is used [14]. *Kaliphal* flower is a good treatment for *Saudaqi Viawas* [17]. A decoction of SBK is used in the treatment of *Zuf-i-Asab* (Nerve Weakness) [17]. Externally, SBK (100gm) and *Til* oil (100gm) are used in *Rasa* [14].

3.2c. *Amraz-i-Jild*

The tincture of *Kaiphal* bark powder has medicinal properties and can be used to treat infected, non-healing wounds [10-14] as well as in the *Phonsi* (Papule) [11]. When powdered stem bark of *Kaiphal* (SBK) is applied, *Qarah Sayyia Yabisa* (Dry Spreading Ulcer), *Qarah Khabisha* (Malignent Ulcer), and *Qarah Mutaffuna* (Septic Ulcer) all have a prophylactic and therapeutic effect [17].

3.2d. *Amraz-i-Qanat Ghiza*

SBK's *Joshanda* is utilised in gastrointestinal disorders such as *Nafakh-i-Mida* (Flatulence), *Dard-i-Mida* (Stomachaches), and *Sual Balgami* (Phlegmatic cough) [10,13,17]. SBK *Joshanda* is also used in *Tanqiya-i-Mida* (stomach cavity evacuation) [11,17] and *Waja-ul-Mida* (stomach pain) due to *Barudat* [11,17]. In *Haiza* (Cholera), SBK's *Zumad* (paste) and *Sonth* (Dry Zinger) were applied topically to the epigastrium [15].

3.2e. ENT disease

To destroy and eliminate worms from the ear, SBK and *Rogan-i-Kheeri* (*Senegalia catechu)* produce an ear drop [11,17] as well as in *Waja-ul-Uzn* (otalgia). In the case of foul smelling in the nose produced by polyps, SBK *safoof* acts as a deodorant [11]. SBK powder is also utilised in faul smelling from nose in the form of *Batti* (Suppositary) [17]. After boiling SBK in Fuqa (alcohol), a solution is made and a cloth wick is dipped in it to treat nasal problems [17]. SBK powder (2 gm) coupled with honey offers therapeutic effects in *Nazla-wa-Zukam* (Common Cold) [14]. *Kaliphal* flower is also used to treat *Nazla-wa-Zukam* (Common Clod) and *Saudaqi Viawas* [17].

3.2f. *Amraz-i-Tanasuli*

A tincture of SBK powder is used in *Qarah-i-Tanasuly* (genital organs) and Perineal Ulcer [11,17]. A paste formed from *Kaiphal* leaf is used topically to the vagina (Abortion) in the treatment

of *Ihetibas-i-Tams* (Amenorrhea) and *Isqat Hamal* [11]. *Usur-i-bawl* (Dysurea) and *Zuf-i-Masana* are both treated with SBK decoction (Atony of urinary bladder) [17] *Mudirrat-i-Tams* (amenogogue) and *Musaqqit-i-Janeen are Mudirrat-i-Tams* (amenogogue) and *Musaqqit-i-Janeen* [17]. *Isqat-i-Hamal* Morover activity is boosted by flower or post coupled with other treatments, such as *Nuskha* of *Farzaja*, and *Kaiphal* is used to help infertile women [17].

3.2g. *Amraz-i-Tanffus*

Sual (Cough) [12,13], *Waram-i-Halaq* (Sore throat) [14] and *Nazla Zukam* (Common Cold) [15] all benefit from SBK's *Safoof* combined with honey. SBK decoction has also been shown to help with *Sual Balghami* (phlegmatic cough) [12,13]. SBK *Safoof* (14 to 12 gm) *Lakhlaqa* (Inhalation) used in *Usur-i-Tanaffus* (dyspnea) caused by *Balgham-Yabis* (Dry Phlegm) [14]. *Sual Balghami*, *Nas al-dam*, and *Waram Halaq* [16] are cough remedies that include powder and honey.

3.2h. Other

Sual Muzmin (chronic cough), *Humma Raba* (Quraten Fever), *Bawaseer* (Piles), and *Jiryan-i-Mani* (Spermatorrhea) have all been successfully treated with SBK powder and *Darchini* [11,17]. SBK and Flower of *Kaiphal* were utilized to dissolve unhealthy materials, which led to infection [17].

Kaiphal leaves a pleasant odour inside the textile and protects it from insects [17].

Nauf al-dam, *Zuf-i-Asab*, and infection in *Akhlat* (Body humours) were employed in the decoction of *kaiphal* [17]. SBK decoction is useful in the treatment of *Nauf al-dam* and infection in *Akhlat* (Body Humours).) [17]. SBK is also vital in halting the flow of morbid *Rutubat (*Moistness) [17]. Externally, SBK (100gm) and *Til* oil (100gm) are used in *Waja Al-mafasil* (Arthritis) [17]. SBK powder, *Haldi* (*Curcuma longa*), *Post-i-Anar (Punica granatum), Tirphala*, Flower of *Dhaye* and *Parnikgo*, and *Amla (Emblica officinalis)* Juice are all used in the treatment of sprains and wounds. [17].

3.3. Distribution of Kaiphal

Myrmica nagi is a tiny, unisexual, evergreen tree native to India, Pakistan, Bangladesh, Sri Lanka, China, Nepal, Vietnam, Burma, and Japan. This plant grows in Punjab, Arunachal Pradesh, Assam, Meghalaya, Nagaland, Manipur, Mizoram, Sikkim, Kamarupan, Khasi, Jaintia, and the Lushai highlands at altitudes ranging from 900 to 2100 metres [6,21].

Plant Morphology

3.4. Properties of *Kaiphal*

3.4a. Taxonomy of Plant [4,22]

Kingdome – Plantae; **Phylum** – Tracheophyta; **Order**: Fagales; **Family** – Myricaceae; **Genus** – Myrica; and **Species** - nagi

c. Synonyms

Myrica esculenta [4]

3.4b. Vernacular Name

Kaiphal in known for their different vernacular based on several regional languages. They are Ood al-Barqe, and Qandul in Arabi, Katphal, Kaichal, kaiphal, and satsarila in Bengali, Box Myrtle, and bay-berry in English, Darshisuan, and Shishaan in Farsi, kapha, kaiphal in Hindi, Isflaus, and Indar khusun in Greek, Kaiphal, and Kariphal in Gujarati, kaphal in jaunsar, sohphi in Khasi, kirishivani in Kannada, kayaphala in Marathi, maruta in Malayalam, katphala in Nepali, kaiphal, kahela, and kahi in Punjabi, Darshishan in Persian, Isha yus, and Isteela yus in Rome, Katphala, kathphala, aranya, and krishnagarbha in Sanskrit, and masudam in Tamil [10,14-17,24]

3.4d. *Mizaj* (Temperament) - Different parts of the *Kaiphal* plant are utilized in USM, each with its own *Mizaj* (temperament).

Table 1: Showing *Mizaj* with their degree

S.No.	Parts	*Kaifiyat* / degree
1	Post (stem bark)	*Haryabis* (2,2) [10,11,13,15,17] *Haryabis* (1,2) [11,16,17,18,19] *Haryabis* (3,3) [11,17], *Haryabis* [11,14,20]
		Barid [11,17]
3	Fruits	*Haryabis* (2,2) [11,17]
2	Leaf	Not mentioned

3.4e. Part of Use – Almost every aspect of the *Myrica nagi* plant has medicinal use in both traditional and conventional medicine. The useable pars in USM are post (Bark of stem) [10-12,17,20], Fruit [11], Leaf [11], and Flower [11]

3.4f. Taste - Chemical compounds vary in quality and amount depending on plant varieties and plant components such as bark, fruits, and roots. As a result, the taste of each plant portion varies to some amount. Different components of *Kaiphal's* taste are listed as –

Post (Stem bark) **:** The taste is *Talkh-wa-Taiz* (Bitter and Pungent) [10], and in some text it described as *Harif* or *Charpari* (Pungent) [17] .

Wood (Phloem): *Kassaila* is the Taste of plant wood components (Acrid) [17]

Fruits: The taste of the fruit is sourish-sweet and delightful [1].

3.4g. Dosage - Unani physicians most typically employ the SBK to treat a variety of ailments. 2–9 gm is the therapeutic dosage range [10-19] are 2-5 gm, 2-4 gm, 3-5gm, 3-9gm**,** and 3.5-7 gm

3.4h. Pharmacological Actions

Various parts of *Kaiphal* produce many previously reported pharmacological actions in USM, including *Muhalil* (Resolvent), *Qabiz* (Astringent) [10-20], *Muqawwi* (Tonic) [16], *Muqawwi Asab* (Neuro tonic) [10-13,15,17,19], *Daf-e-Taffun* (Antiseptic) [10,11,16,18,20], *Daf-i-Tasannuj* (Antispasmodic) [16,18,20], *Daf-i-Istirkha* [19], *Daf-i-Suda* Barid wa Viswas [19], *Tanfis-e-Balgham* (Expectorent) [10,12,13,16], *Nafs-us-dam* (Hemoptysis) [10,12], *Muattis* (Sneezer) [10,12,13], *Jazib-i-Rutubat Dimag* [10,11,13,15], *Isqat-i-Hamal* (Abortificient) [11,17], *Mufatteh* (Deobstruents) [11,17,19], *Mulattif* (attenuant) [17], *Muqawwi-i-asana* [11,17], *Habis* (Styptic) [16], *Habis al-dam* (Coagulant) [11], *Musakhkhin* (Calorific) [17], *Muharrik Asab* (Nervine Stimulant) [20], *Tazfif* (Dessication) [15,17,19], *Musaqqit-i-Dana Bawaseer* [19], *Hazim* (Digestive) [16], *Musakkin-i-awja* (Analgesic) [15], and *Kasir-i-Riya* (Carminative) [15,16].

Mast cell stabilising, anti-asthmatic, anti-oxidant, anti-inflammatory, anti-microbial, antihelmintic, anxiolytic, anti-bacterial, anti-fungal, anti-hypertension, and hepatoprotective are some of the pharmacological actions of *Kaiphal* in conventional medicine [22].

3.4i. Traditional therapeutic Uses

Kaiphal was utilised by Unani Scholars to treat a variety of diseases, including *Faliz* (Hemiplegia) [10,13,15,16,20], *Laqwa* (Facial Paralysis) [10,13,15,16,18,20], *Rasa* (Tremer) [10,13,15,16,18,20], *Tasannuj* (Spasm) [20], *Zuf-i-Asab* [13,16,18], *Mutaffun Zakham* (Infected wound) [10,11,13], *Khidr* (Anaesthesia) [15,16,18], *Qula* (Stomatitis) [10,11,13,15], *Dard-e-Dandan* (Toohach) [10,15], *Muqawwi Asnan* (Teeth tonic) [10], *Muqawwi-i-Aaza* (Visceral Tonic) [17], *Suda* (Headach) [10,15], *Nazla wa Zukam* (Common cold) [10,11,13,15,18], *Humma Nazlawi* (Fever in common cold) [18], *Nafakh-i-Mida* (Flatulenc) [10,13], *Sual-i-Balghami* (Phlegmetic wet cough) [10,13-15], *Viswas Saudawi* (Mania) [11], *Sual Muzmin* (Chronic Cough) [11,18], *Awram-i-Halaq* (Sore throate) [18], *Masso* (Mole) [11], *Usur-i-bawl* (Dysuria) [11], *Nazuf al-Dam* (Hemoorhage) [17], *Istirkha* (Paralysis) of *Asab* (Nerve), *Aaza* (Organs) and *Masana* (Urinary Bladder) [17], *Bawaseer* (Pile) [17], *Akhraz-i-Janeen* (Facilitate delivery) [17], *Waja al-Mafasil* (Joint Pain) [15,16,18], *Sujak* (syphilis) [18], *Kasrat-i-Tams* (Menorrhagia) [18,20], Facilitate delivery[19], *Kasrat-i-Arq* (Hyperhydrosis) [15], *Sujak* (Syphilis) [20], and *Waja Al-mafasil* (Joint pain) [20]

3.4j. *Naf'akhas* (Main Function)

The SBK is useful to a variety of diseases, but the main activity of the medications is *Nazla wa Zukam* (Common cold) [10,13,15,18], *Muqawwi-i-Asab* (Neuro tonic) [10,13,15,18], and *Dafe Dard-i-Mida* (Abdominal Pain) [10,13,18]

3.4k. *Badal* (Substitute)

In the absence of *Kaiphal*, the following medicines are used in its place: *Asaron (Valeriana wallichii)* 10-19, *Zarawand Madhariz* (*Aristolochia indica*) [17,18], and *Darunj* (*Drocenia*) [17,18].

3.4l. *Muzir* (Adverse Effects)

SBK has a deleterious impact on specific visceras of the body, such as *Kabid*, in addition to their positive effects (Liver) [10,11,13,15-19], and *Tihal* (Spleen) [10,11,13,16-19].

3.4m. Corrective (*Muslaeh*)

When utilising one of the following medicines, such as *Mastagi*, you may experience an adverse impact from SBK (*Pistacia nentiscus*) [10,11,15,17,18,19], *Samag-i-Arabi* (*Acacia arabica*) [11,17], *Kateera* (*Astragalus tragacantha*) [11,17], and *Tukhm-i-Gajar Dshti (Daucus carota)* [18].

3.4n. Advantages of Compound Formulation of *Kaiphal*

Herbs can be used alone or in combination with other herbs in USM. The requirement for a combination that satisfies one of the five senses, is simple to give, and reduces or increases the potency of a medicine [11].

3.4o. Commonly Used Formulations of *Kaiphal* in Unani Medicine

SBK is also utilized in a variety of *Murakkabat* (compounds) for a variety of therapeutic purposes, including *Safoof-i-Istihaza* [10,13,15,18], *Rogan-i-Surkh* [10,13,15,16,18,20], *Rogan Muzarrib* [16], and *Rogan-i-Munash* [16].

3.4p. Phytochemical [3,4,6,21]

Table 2: Showing Phytochemicals in different part of the plant

S.No.	Phytochemicals	Parts	Types
1	Tannins and phenolic acids	Fruits	Tannin, Ascorbic acid, Gallic acid, Catechin, Cholorogenic acid, p-Coumaric acid, Caffeic acid, Trans-cinnamic acid, Ellagic acid
		Leaf	Gallic acid, Ethyl-β-D-glucopyranoside; 3-hydroxybenzaldehyde, isovanillin, 4-(hydroxymethyl) phenol, 4-methoxybenzoic acid,
		Bark	Gallic acid, Castalagin, epigallocatechin-3-O-gallate; epigallocatechin-(4β→8)-epigallocatechin3-O-gallate; 3-O-galloylepigallocatechin-(4β→8)-epigallocatechin-3-O-gallate,
2	Flavonoids	Fruits	Myricetin
		Leaf	Myricetin, Quercetin
		Bark	Myricetin
3	Flavonoid Glycosides	Leaf	Myricitrin (myricetin 3-O-rhamnoside, Flavone 4'-hydroxy-3',5,5'-trimethoxy-7-O-β-D-glucopyranosy) (1→4)-α-Lrhamnopyranoside; flavone 3',4'-dihydroxy-6-methoxy-7-O-α-L-rhamnopyranoside Leaves[63] myricetin-3-O-(3''-Ogalloyl)-α-L-rhamnoside; myricetin-3-O-(2''-Ogalloyl)-α-L galactopyranosideside; myrecetin 3-O-(2''-O-galloyl)-α-L-rhamnopyranoside
		Bark	Myricitrin (myricetin 3-O-rhamnoside, Flavone 4'-hydroxy-3',5,5'-trimethoxy-7-O-β-D-glucopyranosy) (1→4)-α-Lrhamnopyranoside; flavone 3',4'-dihydroxy-6-methoxy-7-O-α-L-rhamnopyranoside Leaves[63] myricetin-3-O-(3''-Ogalloyl)-α-L-rhamnoside; myricetin-3-O-(2''-Ogalloyl)-α-L galactopyranosideside; myrecetin 3-O-(2''-O-galloyl)-α-L-rhamnopyranoside
4	Steroids	Fruits	β–sitosterol
		Leaf	β-rosasterol, daucosterol, β-sitosterol-β-D-glucopyranoside
		Bark	β–sitosterol, Taraxerol, Stigmasterol
5	Ionones	Leaf	Corchoionoside C; (6S,9R)-roseoside
6	Diarylhetanoids	Leaf	Myricanol, Myricanone, 5-O-β-D-glucopyranosyl myricanol

		Bark	Myricanol, Myricanone, 16 bromomyricanol
7	Terpenes	Leaf	3-epi-ursolic acid; 3-O-(E)-caffeoylursonic acid, Monoterpinoidal glycosides: myresculoside (4-hydroxy-1,8-cineole 4-O-βdapiofuranosyl (1→6)-β-D-glucopyranosie); (1S,2S,4R)-2-hydroxy-1,8-cineole β-Dglucopyranoside, Triterpinoidal glycosides: arjunglucoside
		Bark	Lupeol; oleanolic acid, Triterpene diol (3β,28-dihydroxytaraxerane), 3β,30-dihydroxy-taraxerane-23-oic acid; 3β,28,30-trihydroxy- taraxara-23-oic acid; 3β,12α,28,30-tetrahydroxytaraxeran-23-oic acid
8	Proanthocyanidin	Bark	Proanthocyanidin acetate, proanthocyanidin methyl-ether, prodelhinidin
9	Volatile compounds	Leaf	Nerolidol, α-pinene, α-selinene, β-caryophyllene, β-selinen, α-caryophyllene, α-cadinol, linaloo
		Bark	n-Hexadecanol; eudesmol acetate; palmitic acid; cis-β-caryophyllene; n-pentadecanol; n-octadecanol
10	Saponin	Leaf	Arjunolic Acid
11	Others	Fruits	Amino acids: L-Hydroxyproline, iso-leucine, valine, 2-aminobutyric acid, L-cystein hydroxyl, L-cystein hydroxychloride, alanine, leucine, tryptophan, glutamic acid, tyrosine, threonine, lysine monochloride, 2-Furancarboxyaldehyde, 2,5-furandionedihydro-3-methylene, furfural, oxirane, myo-inositol, 1-ethyl-4-methylcyclohexane, methyl-d-lyxofuranoside

3.4q. Nutritive value - Because of its pleasant taste, the *Kaiphal* fruit is widely welcomed by the locals. Fibres, proteins, lipids, carbs, and minerals are all present. Table No. 03 shows the nutritive contents [3,4]**.**

Table 3: Showing nutritive contents of fruit and Bark of *Kaiphal*

S.No.	Contents	Fruits	Bark
1	Ash (%)	2.18±0.02	-
2	Moisture content (%)	72.33±0.23	-
3	Crude fat (%)	4.93±0.06	-
4	Crude fibre (%)	5.22±0.08	-
5	Crude protein (%)	9.62±0.03	-
6	Carbohydrates (%)	78.03±0.14	-
7	Energy (Kcal/g)	395.04±0.54	-
8	Minerals (mg/g)		-
	Calcium	4.63±0.06	3.155 ± 0.18
	Magnesium	8.4±0.20	1.061 ± 0.4
	Potassium	7.75±0.11	2.939 ± 0.23
	Phosphorus	0.24±0.25	0.030 ± 0.01
	Sodium	0.81±0.013	0.060 ± 0.03
	Manganese	0.032±0.0001	1.061 ± 0.4
	Zinc	0.216±0.0016	0.006 ± 0.001
	Iron	0.404±0.0021	0.123 ± 0.16
	Copper	0.004±0.0002	-

3.4s. Physicochemical properties (PC) of *Kaiphal* [1,4,25]

Table 4: Showing Physicochemical properties (PC) of *Kaiphal*

S.No.	Parameters	leaves	Bark	Small branches
Extractive value (%w/w)				
1	Methanolic extract	28.32	38.52	-
2	Ethyl acetate extract	25.46	21.20	5.03
3	Aqueous extract	21.28	15.7	3.52
4	pH of 10% aqueous solution	-	4.64	4.88
Ash Values (%w/w)				
4	Total ash	2.83	3.3312	1.856
5	Acid insoluble ash	0.52	1.2300	0.320
6	Foreign matter (% w/w)	<1%	NR	-
7	Loss on drying (%w/w)	-	5	6.81

3.4t. HPTLC of *Kaiphal*.

A number of studies have been conducted on HPTLC of various portions of the kaiphla plant to evaluate a variety of phytochemicals. Fruits were analysed using a solvent made up of n-Butanol, Acetic acid, and water in a 4:1:5 ratio, along with various detection reagents listed in the tables No. 05 [4,6].

Table 5: Showing phytochemicals by HPTLC in different regents along with ethanolic extract of *Kaiphal*

FRUITS				
S.No.	Reagent/Extract	Solvent	Rf value	Phytochemical
1	Visible light/ Ethanolic extract	n-Butanol/Acetic acid/water = 4:1:5	0.25, 0.43, 0.57, 0.75, 0.88	Myricetin, Vitexin, Auireubidin , Lutolin, Apigenin
2	363 nm (U.V)/ Ethanolic extract	n-Butanol/Acetic acid/water = 4:1:5	0.09, 0.18, 0.30, 0.49 0.65, 0.731	Cysteine Atropine, Glycine, Orientin, Azaleatin, Quercitin, chlorogenic acid Rhamnoside, Tricin
3	Iodine Vapours/ Ethanolic extract	n-Butanol/Acetic acid/water = 4:1:5	0.07, 0.09, 0.12, 0.25, 0.30, 0.35, 0.14,	Berberine, Cysteine, Proline, Alanine, Glutamic acid, Gossypetin, Morphine, Glutamine, Aesculin, Cichorin, Scopolin, Quinine, Malvidin,
4		n-Butanol/Acetic acid/water = 4:1:5	0.09, 0.30, 0.51, 0.71, 0.82, 0.88	Cysteine, Valine, Caffeoylglucose,, Asperulin, cellebiose Peonidin, Pelargonidin Isoferulic, umbelliferone
BARK				
S.No.	Reagent/Extract	Solvent	Rf value	Phytochemical
1	Ultrasound assisted technique/ Bark extract	toluene-ethyl acetateformic acid = 5:5:1	0.56	Gallic acid
2	Ultrasound assisted technique/ Bark extract	toluene-ethyl acetate = 8:2	0.38, 0.49, 0.62	Oleanolic acid, Stigmasterol, Lupeol

3.4r. Pharmacognostical studies, Physicochemical and Clinical Studies on *Kaiphal*

i. Anti- Allergic Action

According to Patel KG *et al., Myrica esculenta* at 75 mg/kg and 150 mg/kg significantly reduced (p<0.01) eosinophil infiltration and exudate in pleural fluids due to decreased histamine, cytokines, chemokines production, and mast cell degranulation. [26]. In an egg-albumin driven degranulation of mast cells in rats, Patel T *et al.,* found that ethyl acetate and aqueous extract in doses of 100 and 200 mg/kg produced considerably stronger protection of degranulation in mast cells (45 and 62 % respectively) than prednisolone (65 %). It also had a larger mast cell stabilising impact than prednisolone, with 70 and 78 percent, respectively (65 %) [27].

ii. Anti-inflammatory Action

COX-2 activity is reduced by phytochemicals such myricitrin, myricetin, and corchoionoside C more than ibuprofen, indicating possible antiinflammatory action [28]. Middha SK *et al.,* found that larger doses of *Myrica nagi* significantly reduced (21.71 percent) inflammation in rats generated by carrageenan stimulation when compared to diclofenac (32.75 %). Inflammatory markers such as IL-1 and TNF- were considerably lower (p< 0.05) in the *Myrica nagi* treated group compared to the control group [29]. Patel *et al.,* used an adult Wistar albino rat model to study paw edoema caused by carrageenan and histamine. At 100 and 200 mg/kg, aquos and ethylacetate extracts of *Myrica nagi* bark reduced edeman by 22% and 27%, respectively, compared to asprin (28%) induced by carrageenan, and 18% and 25%, respectively, compared to asprin (27%) induced by histamine [30]**.** On local application of bark oil of *Myrica esculenta* in the ear of Swiss albino mice, Agnihotri S *et al.,* discovered considerable antiinflammatory action [31].

iii. Anti-oxidative

According to Middha SK et al, phenolic compounds found in *Myrica nagi* may reduce short-term inflammation by modulating free-radical activity [29]. According to Mann S et al., a MeOH extract of fresh *Myrica esculenta* fruits produced dose-dependent free radical scavenging activity, with ABTS (1,2,2′-azinobis-[3-ethylbenzothiazoline-6-sulfonic acid]) and DPPH (2,2-diphenyl-picrylhydrazyl hydrate) of 91.910.2 % and 82.572.9 % respectively. [32]. According to Kabra A *et al.,* methanol extract of *Myrica esculenta* produced powerful ABTS and DPPH radical scanvengers with IC50 values of 52.83 g/mL and 39.29 g/mL, respectively [33].

iv. Antihelmintic Action

According to Jain VK *et al.,* aqueous-ethanolic extract of bark of *Myrica esculenta* at a concentration of 12.5 mg/ml produces paralysis in *Pheritima posthuma* in 20.11 minutes and death in 41.25 minutes. The potency of extracts increased as concentration increased [34].

v. Anti-microbial Action

According to Mann S *et al.,* the presence of 2-furancarboxaldehyde, pentadecanoic acid, phytol, and hexadecanoic acid in fruits extract resulted in antibacterial and antioxidant activities [32]. S. Agnihotri *et al.,* conducted a study on *Myrica esculenta* bark oil, which contains n-hexadecanol, eudesmol acetate, palmitic acid, cis-caryophyllene, n-pentadecanol, and n-octadecanol, and had a strong antimicrobial effect against a variety of microbes including Staphylococc [31]. According to Kabra A *et al.,* methanol extract of *Myrica esculenta* is effective against bacterial and fungal strains [33].

vi. Anticancer activity

Due to the presence of gallic acid and ferulic acid, Mann S *et al,.* discovered that MeOH extract of Soh-phie fruits has anticancer action [32].

vii. Renin Angiotensin System Activity

Compounds 3 and 4 inhibit ACE at rates of 29.97 % and 25.% at 100nM concentrations, respectively, according to Nhiem NX *et al.,* whereas compounds 5, 6, and 11 provide mild inhibition at rates of 0.07-1.41 % at 100 nM concentrations [35].

viii. Anxiolytic Impact

According to Khan Y *et al,* an ethanol extract of *Myrica nagi* bark in doses of 100, 200, and 400 mg/kg orally demonstrated substantial dose-related anti-anxiety effects by time spent in the open arms of the elevated plus-maze and in the lit-box. In the tail suspension and forced swimming tests, this study was unable to find an effect similar to antidepressants [36]**.**

ix. Mast cell Stabilizing Impact

K Rana R *et al.* discovered that Myrica nagi (polar extract of bark (PEB) in 200 mg/kg) has antiasthmatic effect that was virtually identical to that of Ketotifen (1 mg/kg). PEB at a concentration of 200 g/ml decreased acetylcholine-stimulated contractions in the trachea of isolated guinea pigs. In rat peritoneal mast cells, it also significantly inhibited degranulation pecntage. Methanolic extract (200mg/kg) and PEB (200mg/kg) reduced the number of eosinophils and neutrophils, as well as serum bicarbonate and tidal volume [37].

x. Neuroprotective activity

According to Kabra A *et al.,* oral form *M. esculenta* (methanolic extract) at doses of 50, 100 and 200 mg/kg in mice with Parkinson's disease caused by intraperitoneal haloperidol 1 mg/kg for 7 days improved behaviour and muscle coordination significantly. In the treatment group, levels of malonaldehyde and malonaldehyde are lower, while levels of antioxidants such as superoxide dismutase and catalase are higher than in the control group. *M. esculenta* (methanolic extract) effectively reduced haloperidol-induced substantia nigra damage [38].

xi. Nephroprotective

According to Dua TK *et al.,* myricitrin reduced oxidative stress by scavenging free radicals, improved internal redox defence by activating Nrf-2, and reduced renal inflammation caused by diabetes by suppressing NF-B. Induced by hyperglycemia, myricitrin also inhibits fibrosis and death in renal cells [39]. Pallab Kar and his colleagues discovered that the fruit juice *Myrica nagi* can be employed as a free radical scavenger to protect kidney patients from the toxic effects of gentamicin [40].

xii. Antiadipogenic activity

According to Prashar Y *et al.,* methanolic extract of *Myrica nagi* inhibits lipase, glucosidase, and amylase, which lowers adipogenesis and increases lipolysis in 3T3-L1 cells. As a result, extract has anti-adipogenic and anti-obesity properties [41].

4. CONCLUSION

Kaiphal plant have numerous therapeutic properties and their significant economic contribution in different regions. Unani and other traditional experts recommend *Kaiphal* for the prevention and treatment of a variety of ailments viz. *Zeeq-un-Nafas, Usur-i-Tanaffus, Faliz, Rasa, Dard-e-Asnan, Qula,Qarah, Sual Balgami, Dard-i-Mida, Waja-ul-Uzn, Ihetibas-i-Tams, and Jiryan-i-Mani*. But limited number of trial were perfomed till date that poorly helped to grasp its efficacy on standard

parameters in the diseases, therefore more research is needed to assess and validate preventive and therapeutic importance of *Kaiphal*.

CONFLICT OF INTEREST

No conflict of interest

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