A review on traditional uses and phytochemical properties of *Mimusops elengi* Linn.

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Abstract

Herbal medicine is getting popularized in developing and developed countries owing to its natural origin and lesser side effects. Medicinal plants are the valuable and cheap source of unique phytochemicals which are frequently used in the development of drugs against various diseases. *Mimusops elengi* Linn. is considered as one of the best medicinal plant due to its several therapeutic uses mentioned in Unani as well as ethnomedicine. The various extracts of the plant (bark, fruit, leaves, seed, and flowers) have been reported to be cardiotonic, alexipharmic and stomachic, hypotensive, antibacterial, anthelmintic, anti-gastric ulcers, teeth cleaner and renewable sources of energy. This review is an attempt to compile and document information on traditional uses and phytochemical properties of *Mimusops elengi* Linn.

Keywords: *Mimusops elengi*, Therapeutic, Unani, phytochemical

1. Introduction

The practices of traditional medicine are based on hundreds of years of belief and observations and analysis, which help in the development of modern medicine. Today, there is widespread interest in herbal drugs. This interest is primarily based upon the belief that herbal medicines are safe, inexpensive and have less adverse effects. The world health organization (WHO) estimates that two third of the world population still depends upon traditional medicines for the treatment of various types of diseases. One such important traditional medicinal plant is *Mimusops elengi* Linn. Commonly known as “Indian Medlar Tree” or “Bakul tree” [1]. It has important place in Hindus as its fragrant flowers are celebrated in the Puranas and even placed amongst the flowers of the Hindu paradise. Krishna is said to have fascinated the milkmaids of Brindaban on the banks of Yamuna by playing on his flute beneath the *Mimusops elengi* tree. Kalidasa has also included in his classical Sanskrit literature *Mimusops elengi* flowers as symbol of love and beauty [2]. This tree served as a staple diet for sages, hermits and people in ancient Indian civilization [3]. In Unani medicine it is known as “Mulsari” and most of the parts of this plant is used in various ways to cure a variety of human diseases like toothache, leucorrhoea, premature ejaculation, syphilis, burning micturition, ulcers of urethra, fever, headache, bodyache, palpitation, loosening of teeth, constipation, weak and spongy gums, pyorrhea, stomatitis, ulcerated throat [4]. The stembark, leaf and seeds of this plant has folk medicinal uses in toothache, scorpion bite, constipation, dental care and diarrhea [5]. The plant is considered useful by tribals in ulcerated tongue, sores, dropsy and anasarca, smallpox, syphilis, sores and carbuncles, consumption, cough, bronchitis and menorrhagia [6]. The bark of *Mimusops elengi* contains small amount of brownish-red coloring matter and is used in certain districts of Bengal for dying shades of brown [7]. Wood used for building purpose, piles, bridges, boats, masts, spars, carts, agricultural implements, rice pounders, crushers and oil mills; also used for furniture, cabinet-work, panels, marble spikes, belaying pins, tools, picture frames, musical instruments and walking sticks. Fruit are edible, also used for preserves and pickles. Kernels yield fatty oil used for edible and lightening purposes. Flowers used for the preparation of an otto used in perfumes [8].

2. Botanical Description

2.1 Taxonomical Classification

Kingdom: Plantae, (Unranked): Angiosperms (Unranked): Eudicots (Unranked): Asterids
Order: Ericales,  
Family: Sapotaceae,  
Genus: Mimusops,  
Species: elengi Linn.

2.2 Botanical name: Mimusops elengi Linn. [9]

2.3 Vernacular Name
Unani: Maulsari Sanskrit: Anangaka, Bakula, Chirapushpa, Dhanvi, Gudhpushpa, Kantha, Karuka, Kesha, Mukula, Padyamoda, Sharakida, Sindhugandha, Simhakeshaa, Sthirmukghandha, Surabhi Tailanga, Varafahdha, Visharada  
Telgu: Babhuli, Bori, Vovoli Hindia: Bakul, Bolsari, Malsarau, Malsuer, Maulsari Marathi: Bakhor, Bakula, Barshal, Ovalli, Owli, Vovoli, Wovali, Wowlia  
Malayalam: Elengi, Ilanni, Ivanu, Mukaram, Bakulam [7,10], Makura, Mukura [6]  
Tamil: Alagu, Ilangi, Kesarem, Kusaram, Magil, Magilam, Valagam [7,10]  
Telugu: Pagada [6,7,10], Vakulamu [6]  
Punjabi: Maulsari, Maulsiri Bengali: Bakal, Bakul, Bohi, Baki [7,10]  
Urdu: Balo, Bokulo Assam: Gokul [8]  
Thai: Pikul [12,13]  
Trade: Bulletwood [6].

2.4 Morphological Description
A large evergreen tree with dark grey fissured bark [14]. The bark is covered externally by a very thick grey suber on the bark are Linalol, Copaene, Isosafrol, cadinene, Phenol, 2, 5-bis (1-methylethyl)-(Thymol), g-cadinene [2]. The bark contains the amino acids such as Tryptophan, Lysine, Methionine, Proline, Glysine and Alanine. The lipid concentration of the bark was ranging from 13.5 to 16.8 mg/gm [19].

2.5 Propagation: by seeds and vegetative method [14].

2.6 Habitat: It is native to Peninsular India [1, 15, 16], found wild throughout south India, Burma, and Andman Islands in evergreen forests [6, 11, 14, 17]. This large ornamental tree is also cultivated in gardens for its fragrant flowers [6, 11, 17].

2.7 Phytochemical properties
Bark: The important constituent of bark are alkaloids, starch, tannin, saponins contains some caoutchouc, wax, coloring matter, starch and ash forming inorganic salts [7,10,11]. Saponin was isolated from the ethanolic extract of the bark, which on hydrolysis yielded 2-β-amyrin and bassic acid [6, 7, 18]. Hexane soluble fraction of the alcoholic extract yielded taxeraxone, taxeraxor, α-spinasterol, sodium urosolate and betulinic acid, whereas hexane insoluble fraction yielded β-D-glucoside of β-sitosterol and the aqueous extract, gave quercitol. Other pentacyclic triterpenoids betulic acid (2 -167), lupeol (4-167), taraxerol (3-167) and ursolic acid (3-167). Fatty acid ester of α-spinasterol (3-167) was also isolate from bark. The petroleum ether extracts of stem bark yielded α-spinasterol and taraxerol [6, 7]. Steam distillation of bark sample yielded 0.18% of volatile organic matter. The volatile oil constituents of the bark are Linalol, Copaene, Isosafrol, β-caryophyllin, Saffrol, δ-cadinene, Phenol, 2, 5-bis (1-methylethyl)-(Thymol), γ-cadinene [2]. The bark contains the amino acids such as Tryptophan, Lysine, Methionine, Proline, Glysine and Alanine. The lipid concentration of the bark was ranging from 13.5 to 16.8 mg/gm [19].

Seeds: The seeds contain pentacyclic triterpene acids, mimusopic acid and mimusomopic acid [19]. The Ethanolic extract of M. elengi seeds yielded quercyiloil, dihydroquercetin, quercetin, β-D-glucoside of β-sitosterol and α-spinasterol. The fatty oil from seeds comprised capric, lauric, myristic, palmitic, stearic, arachidic, oleic and linoleic acids; the unsaponifiable matter from the seed fat consisted of β- and γ-sitosterol [6].

Root: The root contain steroidal saponin, 5α-stigmast-9(11) en-3-O-β-D-glucopyranosyl (→(5))-O-β-D-xylofuranoside [19]. The roots on extraction with ethanol gave lupeol acetate, taraxerol, α-spinasterol and β-D-glucoside of β-sitosterol.

Flower: Fresh flowers of M. elengi on extraction with acetone yielded D-mannitol, whereas on extraction with ethanol it gave β-sitosterol-β-D-glucoside. The ethanolic extract of the flowers yielded quercitol, ursolic acid and a triterpene alcohol which was later identified as lupeol [6].

Leaves: The leaves contain sterols, reducing sugars and tannins [19]. The ethanol extract of M. elengi leaves yielded quercitol, hentriacontane, β-carotene and glucose [6].

Fruit: Pulp of the fruit contains a large proportion of sugar and saponin [11].

3. Mahiyat (Description in Unani Literature)
The tree is 40-50 feet or more in height. Stem is small with several branches. Leaves are slender and smooth [4]. It gives many small flowers in summer season. Colour of flower is sandal [4, 20] and gives peculiar sweet smell like mahua fruit. Dried flowers give more smell. It gives 1 inch long fruit. The colour of unripe fruit is green while of ripe fruit is yellow. The shape of fruit is conical. The pulp of fruit is sweet and astringent in taste [4]. The pulp contain a large seed which contain bitter and foul smelling pulp [4, 20]. This plant has two varieties male and female. Male variety does not produce fruit while female variety produces fruit [4].

3.1 Actions Mentioned in Unani Medicine
Flower: Mufarrah (exhilarant) wa Muqawwi-e qalb wa dimagh (cardiac and brain tonic) [4, 20, 21]  
Bark: Musakkin-e alam (analgescis) [4, 20, 21], Habis-ud Dam (anti-haemorrhagic/styptic) [4, 22], Dafa-e Taffun (antiinfective/anti-putrefactive) [4, 22], Dafa-e Safra (cures biliouness) [4, 22], Mumsik-e mani (semen retenitive), Dafa-e Humma (antipyretic) [4]  
Dafa-e jaryan wa sailan [4, 22, 23], Habis-e ishal (antidiarrhoeal) [21], Qabiz (astringent) [23]  
Ripe fruit: Muqawwi-e meda (stomachic) [4]  
Unripe fruit: Qabiz (astringent) [4, 21, 23], Mumsik-e mani (semen retenitive) [4], Habis-ud Dam (anti-haemorrhagic/styptic), Habis-e ishal.

3.2 Therapeutic Uses Mentioned in Unani Medicine

**Bark:** Powder of bark is used to treat leucorrhoea. Gargling with decoction of bark is used to treat stomatitis, toothache and helps in strengthening the teeth [4, 20, 21]. Its *khesanda* is used in gonorrhoea, burning micturition and urethral ulcers [4, 20, 21, 23]. Powdered bark along with jiggery is used to treat leucorrhoea. Its decoction is also helpful in removing bodyache and fever. Its bark can also be used to treat infertility in women.

**Wood:** Small branches can be used as tooth stick which strengthens the root of teeth and gums

**Leaf:** It is used to treat haemorrhage, leucorrhoea and excessive sweating.

**Flower:** Drinking of juice of flowers [4] and inhalation of powdered dry flower act as a brain and cardiac tonic, used in palpitation [4, 20, 21], stops running nose and headache and also helpful in brain diseases because it contains volatile oil. It reduces excessive sweating because of its anti-perspiratory action. Grinding of flowers along with *suhaga* and rose can be used in ringworm infection [4]. To stop running nose, its dried flower can also be used in hukka in place of tobacco. Powdered dry flower is used for cleansing the teeth which also helps in strengthening the teeth and gums. Its *Arq* (distilled) is used as exhalant [4, 23]. Its flower and fruit along with other astringent medicines can be used for washing wound [9]. Along with sandal its flower is used in making perfumes [20].

**Fruit:** Fruit is used in diarrhoea and chronic dysentery because of its astringent property [4, 20]. Eating ripe fruit acts as cardiac tonic and also helpful in toxemia due to its anti-putrefactive action. Local application of fruit as a snuff to treat cephalalgia [14, 24, 26]. Flowers are also used as an expectorant, cures biliousness, liver complaints, diseases of the nose, headache. The smoke of the flower is used for treatment of asthma [23]. Extracts of flowers are used against heart diseases, leucorrhoea and menorrhagia and act as anti-diuretic in polyuria and antitoxin. The stuff made from the dried flowers is used in a disease called *ahwa* in which strong fever, headache, neck pain, shoulder pain and pain in the other parts of the body occurs [9]. The water distilled from the flowers is used as a stimulant medicine, calm anxiety, panic attacks and brain tonic.

**Seed:** The suppository made from seeds used for constipation in children. Keeping seed in mouth strengthens the teeth. Oil obtain from seeds is used for cooking purposes.

**Root:** Gargling with decoction of root reduces stomatitis, strengthens the teeth and gums and also helpful in burning micturition, urethral ulcers. Its decoction is also helpful in bodyache [4]. Bark of root is useful in backache, leucorrhoea, premature ejaculation, and also makes the semen viscid [4, 20].

**Mizaj (temperament)**

**Bark:** Hot and dry [22], Cold and dry [20, 21] **Flower:** Hot and dry [20] **Fruit:** Cold and dry [21, 23]

**Muzir (adverse effect):** *Nafakh* and *qabiz* [20, 21, 23]

**Musleh (correctives):** Honey, *Roghan* [20, 23], Hot and wet food [23], *Maviz* munaqqa [21]

**Badal (substitute):** Bark of *babool* [20, 23], Fruit of *babool*, *Qabizat* [23], *Halela siyah* [21]

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*Murakkab (formulation):* *Sagofee sailan* [22]

4.1 Actions mentioned in ethnomedicine

**Bark:** astringent, tonic [1, 14, 24], cooling, anthelmintic [14, 24, 25], antipyretic [10], cardiotonic, alexipharmic, cures biliousness, stomachic [28] **Flower:** tonic, astringent [1] **Fruit:** cooling [25, 26], astringent [11, 25, 26], flatulent [25], stimulant/water distilled [11] **Leaves:** antioxidant, cytotoxic, analgesic, wound healing, antipyretic **Root:** aphrodisiac, diuretic, cardiotonic, stomachic, astringent [23] **Seed:** purgative [11]

4.2 Therapeutic uses mentioned in ethnomadicine

**Bark:** The bark is used as a gargle for odontopathy, ulitis and ulemorrhagia. Tender stems are used as toothbrushes [14, 29]. Rinsing mouth with bark decoction is believed to strengthen the gums, reduce inflammation, and prevent bleeding of gums and stop bad breath caused by pyorrhoea and dental caries [26, 27]. It is useful in urethorrhoea, cystorrhoea [14, 24], diarrhoea and dysentery [1, 8, 14, 24, 28]. It is useful in discharges from the mucous membrane of the bladder and urethra. The bark is said to be much sought after in the Panjaut as a medicine for increasing fertility in women. It is useful in fever as a general tonic [17]. Decoction of bark is used to wash the wounds [9].

**Flowers:** Flowers are used for preparing a lotion for wounds and ulcers [14, 29]. Powder of dried flowers is a brain tonic and is useful as a snuff to treat cephalalgia [14, 24, 26]. Flowers are used as stimulant [8]. The flowers are also used as an expectorant, cures biliousness, liver complaints, diseases of the nose, headache. The smoke of the flower is used for treatment of asthma [23]. Extracts of flowers are used against heart diseases, leucorrhoea and menorrhagia and act as anti-diuretic in polyuria and antitoxin. The stuff made from the dried flowers is used in a disease called *ahwa* in which strong fever, headache, neck pain, shoulder pain and pain in the other parts of the body occurs [9]. The water distilled from the flowers is used as a stimulant medicine, calm anxiety, panic attacks and brain tonic.

**Fruit:** Unripe fruit is used as a masticatory. It is therefore recommended to be chewed for fixing loose teeth [14, 17, 24]. The pulp of the ripe fruit is edible and contains a large amount of sugar and is applied to relieve headache [17]. Ripened fruits facilitate a cure for burning urination. The ripe fruit pounded and mixed with water is given to promote delivery in childbirth [9].

**Seeds:** From the seeds a fixed oil is obtained by expression, which is used for culinary purpose, for burning [17]. The seeds bruised into a paste and mixed with oil or ghee are made to form suppositories in cases of obstinate constipation especially in children [11, 14, 17, 24]. Seeds are used to fix loose teeth, as an errhine cures nasal congestion and headache [25]. It is also used for curing piles. The seed oil is used in cooking and as a luminant [30].

**Leaves:** The leaves are used in the treatment of fever, postural eruptions of skin, ulcer, headache, dental diseases, bacterial diseases [25, 31]. Leaves are used as an antidote for snakebite [32]. Leaf is one of Sushruta’s snake remedies. Half teaspoonful of expressed juice of fresh leaves is poured in nostrils in stupor and coma [33]. Boiled leaves are applied to the head as a cold compress for headache and juice of the leaves squeezed into...
the eye for sore eyes [34].

Root: Decoction of a root bark along with the milk taken in the morning for three days could strengthens the teeth of even an old person [7].

5. Conclusion
In the present comprehensive review, we referred primary and secondary data to compile the information based on taxonomy, origin, distribution, description, phytoconstituents and traditional claims on Mimusops elengi. There is a grim need to isolate and identify new compounds from different parts of the tree and also more studies are needed before the pharmacological properties of Mimusops elengi can be utilized in therapy.

6. References
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