A REVIEW ON MYRISTICA FRAGRANCE

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ABSTRACT-

Today, there is a huge demand for herbal medicine on the international market, but there is a dearth of information about the criteria and techniques used to evaluate the efficacy of drugs. Two spices, nutmeg (Jaiphal) and mace (Javitri), are derived from the Myristica fragrance, also known as the nutmeg tree, which is a member of the Myristicaceae family. Mace is the fleshy, crimson, net-like skin covering (aril) on the nutmeg kernel, whereas nutmeg is the seed kernel found inside the fruit. It contains a variety of chemical compounds, including eugenol (4-allyl-2-methoxyphenol), myristicin, and macelignan. Nutmeg has a wide range of pharmacological properties, including hepatoprotective, anti-oxidant, memory-improving, cytotoxic, aphrodisiac, anti-diabetic, anti-depressant, hypolipidemic and hypocholesterolemic effects, anti-microbial, antibacterial, anti-inflammatory, anti-carcinogenic, flavoring, and pesticidal effects. This article reviews many pharmacological properties of this medicinal plant.

Keywords: Myristica fragrance, Nutmeg, Mace, Myristicin.
INTRODUCTION

Myristica fragrans, also referred to as nutmeg, is a medium-sized, evergreen aromatic tree that is a member of the Myristicaceae family. Both the fleshy aril (mace) and the seed (nutmeg) are used as seasonings. It has 4% myristicin in it, a fat made from the seed. It is used to cure rheumatism and promote digestion in medicine. Additionally used for diarrhoea, mouth sores, and sleeplessness are myristica scent seeds. Malabaricon C, which is derived from the aroma of myristica, has been shown to have inhibitory effect against a variety of anaerobic and aerobic microbes. The main fragrant component of nutmeg’s volatile oil is myristicin. The use of nutmeg as a spice has endured. Numerous formulations of nutmeg (Myristica fragrans) are still used as aphrodisiacs, digestive aids, hypnotics, analgesics, and amenorrheal agents. Both the seeds and the fruits of these plants are used in traditional medicine to treat diseases like diarrhoea, sexual dysfunction, weakness, and skin discoloration. It is used as a treatment for cholera related nausea, stomachaches headaches, vomiting, and diarrhoea. It significantly enhances the blood circulation, boosts up the brain functioning. The main fragrant component of nutmeg’s volatile oil is myristicin. Its essential oil can help with injuries including muscular strains and sprains. Myristica fragnans is most frequently used as a stimulant, aphrodisiac, antulcerogenic, analgesic, diuretic, anti-pyretic, hypolipidemic, hypnotic, hallucinogenic, antispasmodic, anti-inflammatory, and anti-oxidant drug. It improves digestion. This review's objective is to highlight the diverse pharmacological effects of Myristica fragrans.

Taxonomy of M. fragrans and vernacular names-

Taxonomy -

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Plantae</th>
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<tbody>
<tr>
<td>Division</td>
<td>tracheophytes</td>
</tr>
<tr>
<td>Class</td>
<td>magnolippsida</td>
</tr>
<tr>
<td>Order</td>
<td>Magnoliaceae</td>
</tr>
<tr>
<td>Family</td>
<td>Myristicaceae</td>
</tr>
<tr>
<td>Genus</td>
<td>Myristica</td>
</tr>
<tr>
<td>Species</td>
<td>M.fragrance houtt.</td>
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Vernacular names

<table>
<thead>
<tr>
<th>Hindi</th>
<th>Jaiphal,Malatiphal</th>
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<tbody>
<tr>
<td>English</td>
<td>Nutmeg tree</td>
</tr>
<tr>
<td>Sanskrit</td>
<td>Jatiphalam,Malatiphalam,Majjasaram,Sugandha Puta,Madashouda</td>
</tr>
<tr>
<td>Urdu</td>
<td>Javit,Jauzbuwa</td>
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<tr>
<td>Bangoli</td>
<td>Japatri ,Jotri</td>
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<tr>
<td>Gujrat</td>
<td>Jayapatri</td>
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<tr>
<td>Kannad</td>
<td>Jaapatri</td>
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<tr>
<td>Tamil</td>
<td>Japatri,Jatikkai,Sathiccupi,Jadhikai</td>
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<tr>
<td>Telugu</td>
<td>Jadipattiri,Jaji kaya</td>
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<tr>
<td>Malayalam</td>
<td>Jadipalliol,Jathika</td>
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<tr>
<td>Marathi and gujarati</td>
<td>Jaipal</td>
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</tbody>
</table>
**Varieties** - The other species in the family are *M.anadmanica, M.malabarica, M.magnifica, M.amygdalina, M.beddomeii, M.prainii and Knema andamanica, Warb. Myristica attenuata*.

**Adulterant**-
Myristica malabarica is a common adulterant; it is also called Bombay Nutmeg.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Type of adulterant</th>
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<tbody>
<tr>
<td>Nutmeg</td>
<td>coffee husk</td>
</tr>
<tr>
<td>Nutmegmace</td>
<td>Bombay mace</td>
</tr>
<tr>
<td>Mace (Myristica fragrance)</td>
<td>mace (Myristica malbarica)</td>
</tr>
</tbody>
</table>

**Botanical description** - Distribution areas include India, South East Asia, North Australia, and Pacific islands. East Indonesia's Banda islands in the Moluccas are home to the nutmeg tree. Grows in South Indian states like Karnataka, Kerala and Tamilnadu.

Tree with sylinclride branches
Leaves - Coriaceous, elliptic oblong or lanceolate
Flowers - Ellipsoid, Male flowers are seen in supra axillary racemes.
Fruit is ovoid, sub globose or pyriform

**Medicinal qualities**

*Jaiphal* is *katu* (pungent) in *vipaka*, *Tikta* (bitter) and *katu* (pungent) in *rasa* has *Ushan veerya* (hot potency) and possesses *Laghu(lightness)* and *Teekshna* (strong, penetrating) *guna*.

**Effect on doshas** - Balance kapha and vata dosha

**References in ayurvedic textbooks**

*Charak* - *(charak samhita sutra sthan 5/73, chikitsa sthan 17/26 & chikitsasthan 28/151)* jatiphal mentioned three times

*Jatikosha* – mentioned in charak samhita twice, chikitsa sthan 26/209 & chikitsa sthan 28/150 as well

*Sushrut* - twice susrut samhita sutra sthan 46/202 & chikitsa sthan 24/31

*Jatikosa* - in susrut samhita sutras than 46/202

*Vagbhatta* - Twice in Astang hridayam chikitsa sthan 21/77 & uttar tantra 22/93 as well
In A.H. chikitsa sthan 21/77, vagbhatt described jatikosha as jatipatrika (a.h. uttartantra22/93)

**Pharmacologically active parts of the plant**

The most important part of the plant in terms of its pharmacological activity and also in commerce, is of course the dried kernel (seed), the nutmeg aril of the fruit (seed case), generally known as mace. The oil of nutmeg has also been used for medicinal purpose.

**Chemical Constituents:**

5 to 16% volatile oil and roughly 30% fat are both present in nutmeg. About 4 to 8% of the volatile oil is made up of myristicin, elimicin, and safrole. Myristic acid, palmitic acid, oleic acid, lauric acid, and other acids make up the majority of the fixed oil's fatty acid composition (approximately 60%). Nutmeg butter is another name for the nutmeg's fat. Protein and starch are the drug's other ingredients.

![Chemical Constituents](image)

**Cultivation and Collection:**

The tree-like plant has separate male and female blooms. The drug is produced using the female plants. Between sea level and 900 meters above sea level, nutmeg can be grown. It thrives in humid regions. Red lateritic soil and sandy loam are the best soil types for cultivation; they both need 200 to 250 cm of rainfall.

The plant is grown by sowing the seeds. Only freshly collected seeds can be used for cultivation. Nutmeg can also be grown vegetatively.

The seeds need two to three months to germinate. When seedlings are between 16 and 18 months old, they are transplanted at a distance of 8 to 9 meters. The nutmeg fundamentally needs shade to defend itself.

The plants receive fertilizers and manures on a regular basis. The plants yield fruits all year round, but from December to May they produce the most. The fruits are ready to be picked when the husk of the fully mature nut separates.
Formulations-

*Jatiphaladi churna, Jatiphaladi vati, Ahiphenasava, kasturi bhairav ras, khadiradi gutika, Mahagandhak vati, Garbhchintamani rasa*

**Side Effects of Nutmeg:-**

- The negative effects of nutmeg may resemble those of anticholinergic poisoning. It may cause neurological symptoms like tingling, hallucinations, giddiness, and euphoria when taken in large doses. Following these symptoms, delirium and excessive sleepiness may occur.

- Common unfavourable side effects include nausea, headaches, dizziness, vomiting, stomach discomfort, and tremor. Elemicin and myristicin, two narcotics that have psychotropic (affecting mental activity) properties, are found in nutmeg.

- Other side effects from nutmeg use include increased liver fat accumulation, trouble urinating, and transient constipation. Nutmeg powder can be effective as a hallucinogen, but excessive use can cause delirium and epileptic seizures. 

**Precautions to take with Nutmeg (Jaiphal)**

- Taking nutmeg is not safe to take during pregnancy and must be avoided. Pregnant women might present with agitation, palpitations, anxiety, dry mouth, blurred vision, and chest tightening when taken in large amounts.
- It is essential to not take it in high doses since it possesses narcotic effects.
- It might trigger asthma and cause allergies.
- There is not sufficient information about the safety of consuming nutmeg during breastfeeding. It is better to avoid taking nutmeg while breastfeeding.

**Interactions with Other Drugs:**

- Drying Medications (anticholinergic drugs)- Nutmeg might reduce the efficiency of these drugs.
- Medications Metabolized by the Liver- The liver breaks down several medications. There may be some negative consequences if nutmeg is consumed while taking such drugs. As a result, it is crucial to exercise caution when using this combination.
- Acetylcholinesterase (AChE) Inhibitors (medications for Alzheimer’s disease)- The negative effects of the drugs used to treat Alzheimer's disease may be worse if nutmeg is consumed along with them.
CNS Depressants or Sedative Medications- Nutmeg consumption could make you feel sleepy. Additionally, sedatives cause sleepiness. Combining these could result in serious pathological drowsiness.

- Medications used for glaucoma etc. (Cholinergic drugs) - Nutmeg consumption can increase some chemicals in the brain, heart, and other parts of the body. Few medications used in the management of glaucoma, Alzheimer’s disease, and other conditions might also affect these chemicals. Taking these medications with nutmeg can result in the development of side effects.

PHARMACOLOGICAL ACTIONS

*Myristica fragrans* Houtt. is associated with a wide range of biological properties which are useful in treating several diseases. Some of its therapeutic properties are mentioned below-

**Aphrodisiac** It was observed that 50% ethanolic extract of the plant exhibited aphrodisiac activity.

**Effect on memory** Myristica fragrans seeds on the learning capacity and memory of the models used. The memory impairment was induced by scopolamine and diazepam. It was found that n-hexane extract significantly worked on learning capacity and memory.

**Anti-diarrhoeal** A study conducted on Guinea pigs revealed that hexanesoluble fraction was associated with inhibition of secretory responses which were induced by E. coli heat labile (LT) and heat stable (ST) enterotoxins.

**Anti-stress**- A study was conducted on Albino rat models (two methods that are the forced swim test (FST) and the tail suspension test (TST) method) and it was observed that M. fragrans extract significantly reduced the immobility periods of mice in both the FST and the TST methods.

**Anti-diabetic**- extracts obtained from M. fragrans is associated with antidiabetic potential. It activates the peroxisome proliferator receptor, which helps in improving the insulin sensitivity and lipid metabolic disorders.

**Anti-convulsant**- nutmeg oil exhibits anti-convulsant properties. During the study nutmeg oil showed anticonvulsant activity against tonic seizures induced by pentylenetetrazole which supports its use as an anticonvulsant agent.

**Antithrombotic**- As per the data report of an in-vitro study it was revealed that eugenol and iso-eugenol were associated with inhibition of platelet aggregation; this attributes to its antithrombotic activity.

**Hepatoprotective**- the seed of Myristica fragrans on obesity and inflammation is associated with Nonalcoholic fatty liver disease (NAFLD). It was revealed from the study that, alcohol extract of nutmeg significantly reduced the body weight and levels of inflammation, cholesterol and lipid accumulation, blood glucose which supports its use as a hepatoprotective agent.
Anti-microbial- The mace of M. fragrans has potent anti-microbial action against Staphylococcus aureus and Candida albicans. It was revealed that resorcinols malabaricon B and malabaricon C both showed significant antimicrobial potential against Staphylococcus aureus and Candida albicans. Dehydro-diisoeugenol and 5-methoxydehydrodiisogenol significantly helped in the inhibition of Streptococcus mutans growth. xvii xviii

Anti-oxidant- anti-oxidant potential of nutmeg essential oil is due to its synthetic anti-oxidants like BHA (butylated hydroxyanisole), BHT (butylated hydroxytoluene), alpha tocopherol and pyrogellol. xix

Hypolipidemic effect- administration of seed extract of M. fragrans exhibited properties like reduction in serum cholesterol and LDL cholesterol by 69.1 and 76.3%. It also lowered down the ratio of cholesterol/phospholipid by 31.2% and it significantly elevated the ratio of decreased HDL. xx xxi

Classical therapeutic uses of myristica fragrance

Generalised use -: Its topical applications include its use as an anti-inflammatory and analgesic agent. It is beneficial for skin disorders, and also acts as an air freshener. It is used in treating cold and headache. It is used against joint inflammation in lepa form. It is useful in removing the foul smell of wound.

Systemic actions

Nadi sansthan (Nervous system): It is an analgesic and antiepileptic agent. It is used in treating insomnia, epilepsy and pain.

Paachan sansthan (Digestive system): It is used as an appetizer and anthelminthic agent. It enhances digestion and increases the liver metabolism. It is used in the treatment of diarrhoea, dysentery, irritable bowel syndrome, constipation, lose motion, cholera. It reduces thirst.

Rakatwah sansthan (Circulatory system): It is helpful in treating cardiac problems.

Swasan sansthan (Respiratory system): It is used as an anti-mucolytic agent. It is helpful against cold, cough, asthma and hiccups.

Prajannan sansthan (reproductive system): It is an aphrodisiac. It is helpful in inducing menstruation and ovulation. It is used in treating erectile dysfunctioning, amenorrhea, and dysmenorrhea.

Twacha (Skin): It is useful against various skin related disorders.

Taapkram (Temprature management): It is used as an anti-pyretic.

Satmikar (Other uses): It is used in treating malnutrition caused by diarrhoea. xiii xiii
Folk view

In India it is used a sedative to treat various disorders related to nervous system. The tribal people of Kurumba, Tamil Nadu, use fruits in pickle form to cure problems related to digestion while the seeds are used along with the breast milk to provide immunity to the infants. Traditional healers of, Telangana, use leaves and fruits to treat nervous disorders. In Odisha, people use fruits in many home remedies. The decoction of fruit is administered orally against dysentery in Karnataka. People use boiled seeds of M. fragrans along with P. nigrum, P. longum and O. tenuiflorum to treat malaria in Karnataka. In Paliyan tribes of Southern India, people use seeds along with milk to enhance their digestion. In Rangamanti district, this medicinal plant is used against fever. Some tribes of Gujrat use M. fragrans fruit against hemorrhoid. In Rajasthan, the fruit of this plant is used in cooking as a spice and to enhance the flavor. The Gaddi tribes of Kangra district of Himachal Pradesh use jaiphal along with ajwain seeds and choti elaichi to treat diarrhoea among infants. In Assam, jaiphal al is used in treating dysmenorrhea. Jaiphal is a very common home remedy for cough and cold.

Conclusion

M. fragrans is a promising herb which is most commonly used in traditional systems of medicine for treating numerous human ailments which exhibit significant biological properties such as hepatoprotectivity, anti-microbial, anti-stress, anti-diabetic etc. Apart from its therapeutic uses, it is well known spice used in almost all type of cooking. In Ayurveda it is used to treat skin disorders, insomnia, pain, epilepsy, vomiting, stress, IBS, cardiac disorders, erectile dysfunctioning etc. This medicinal plant with multiple therapeutic uses can be a promising and reliable source of new drugs in future. More research should be done to find its secondary metabolites which can be an aid to healthcare system.

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