



ORIGINAL RESEARCH PAPER

Ayurveda

THE EXPANDING ROLE OF NUTMEG: A REVIEW OF ITS MEDICINAL PROPERTIES, UNLOCKING ITS THERAPEUTIC POTENTIAL

KEY WORDS: Myristica, Myristicin, Detoxifier, Jatiphala, Nutmeg.

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ABSTRACT

Nutmeg (*Myristica fragrans* Houtt.) is a well-known culinary spice that has been valued for centuries in traditional medicine due to its diverse pharmacological properties. In recent years, growing scientific interest has highlighted its potential as a natural source of bioactive compounds with promising therapeutic applications. This review critically examines the current evidence on the medicinal properties of nutmeg, emphasizing its phytochemical composition, mechanisms of action, and therapeutic relevance. Major constituents such as myristicin, elemicin, eugenol, safrole, and various phenolic compounds contribute to a wide range of biological activities, including antioxidant, anti-inflammatory, antimicrobial, analgesic, hepatoprotective, neuroprotective, antidiabetic, anticancer, and gastroprotective effects. Experimental and preclinical studies suggest that nutmeg may play an important role in preventing and managing chronic diseases associated with oxidative stress and inflammation. The review also discusses its applications in food preservation, nutraceuticals, cosmetics, and pharmaceutical formulations, reflecting its expanding industrial significance. Despite these encouraging findings, concerns regarding toxicity, psychoactive effects at high doses, and limited clinical evidence underscore the need for standardized dosage guidelines and well-designed human studies. Overall, this review highlights the evolving role of nutmeg as a multifunctional medicinal plant and identifies future research directions necessary to translate its therapeutic potential into safe and effective clinical applications.

INTRODUCTION

Nutmeg (*Myristica fragrans* Houtt.), commonly known as **Jatiphal**, is one of the oldest and most valued spices used by humans for culinary, medicinal, and aromatic purposes. Native to the Maluku Islands of Indonesia, it is now cultivated in many tropical regions of the world. The dried seed of the fruit is known as nutmeg, while the reddish aril surrounding the seed is called mace (Javitri). In traditional systems of medicine, particularly Ayurveda, Unani, and Traditional Chinese Medicine, Jatiphal has long been recognized for its diverse therapeutic applications, including the management of digestive disorders, insomnia, pain, inflammation, and nervous system ailments.

Modern phytochemical investigations have revealed that nutmeg contains a wide range of bioactive constituents, including essential oils, phenolic compounds, lignans, flavonoids, and terpenoids, which contribute to its biological activities. Experimental and clinical studies have demonstrated its antioxidant, antimicrobial, anti-inflammatory, antidiabetic, hepatoprotective, neuroprotective, cardio protective, and anticancer potential. These findings indicate that nutmeg may serve as a valuable source of natural compounds for the development of future therapeutic agents.

Common Names and Taxonomy

Nutmeg is derived from the Latin *nux muscata*, meaning musky nut. Worldwide, different common names, like Sanskrit: Jatiphala, Jaiphol, Malatiphala Bengali: Jatiphala, Jayaphala, Telugu: Jjajikaya, Gujarati: Jayaphala, Hindi: Jati-phal, Jayaphal, English: Nutmeg, Kannada: Jakayi, Malayalam: Jathikka, Marathi: Jatiphala, Nepali: Jaiphal, Oriya: Jasiphala, Punjabi: Jafal, Tamil: cati-k-kay. *M. fragrans* belongs to the plantae kingdom, with the kingdom of Viridiplantae. It falls within the division Tracheophyta, which includes the vascular plants. It is further categorized under the class Magnoliopsida and the order Magnoliales. It is a member of the Myristicaceae family.

Distribution

In India, *Myristica* species are predominantly found in the

biodiversity-rich Western Ghats. Approximately five species have been documented from South India, among which *Myristica dactyloides* Gaertn. is an indigenous species occurring in the evergreen forests of the Western Ghats, particularly in Tamil Nadu. The warm, humid climate and well-drained soils of these regions provide favorable conditions for the growth and survival of *Myristica* species.

Morphology of the Plant

Myristica fragrans usually reaches a height of 10 to 25 meters. The fruit of ***Myristica fragrans*** is a succulent drupe that opens naturally into two valves upon reaching maturity. It encloses a single, smooth, dark brown seed wrapped in a striking scarlet-red aril known as **mace**. As the fruit ripens, its outer surface gradually changes from green to yellow before splitting open. The seed, commercially recognized as **nutmeg**, is oval-shaped and protected by a hard, textured seed coat with fine wrinkles. Both the seed and the aril possess considerable economic value because of their extensive use as spices and their abundance of essential oils and biologically active constituents.



Parts used:

Seed, Arillus (mace)

Dosage: 1 – 3 grams

Chemical Constituents:

The principal constituents of Nutmeg are a Fixed oil, Volatile oil 3% containing D-pinene, Myristin, Myristic acid and its Ester, Myristicin, Fatty acids etc.

Nutritiousness:

Vitamins A, C, and E, electrolytes (sodium and potassium), minerals (calcium, copper, iron, magnesium, manganese, zinc, and phosphorus), phytonutrients (carotene-B and cryptoxanthin B), volatile oil (6-16%), starch (4.6-24.2%).

Myristica fragrans in Ayurveda

Rasa :Katu,Tikta Guna :Laghu,Tiksna

Virya :Usna Vipaka :Katu

Karma:Dipana,Grahi,Vrsy,Mukhakledanasaka,Mukhadaurg andh yanasaka,Kaphavatapana Important formulations – Jatiphaladi Curna, Dadimavaleha,Nasika Churna, Mrita Sanjivani Gulika

Therapeutic uses – Atisara , Svasa , Chardi , Kasa , Pinasa , Grahmi,Mukharoga,Sukrameha.

Dose - 0.5 - 1.0 g of the drug in powder form.

Classical Categorization:

- Bhavaprakasha Nighantu: Classified under *Karpuradi Varga*.
- Dhanvantari Nighantu: Classified under *Chandanadi Varga*.
- Kaiydeva Nighantu: Listed in *Aushadhi Varga*
- Charak Samhita
- Sushrut Samhita



MEDICINAL PROPERTIES OF JATIPHAL:

Jatiphal (*Myristica fragrans* Houtt.) is a valuable medicinal spice widely used in traditional systems of medicine, including Ayurveda, Unani, and Traditional Chinese Medicine.

Antioxidant Activity

Due to its rich content of phenolic compounds and flavonoids. These constituents neutralize reactive oxygen species (ROS), reduce oxidative stress, and protect cellular components from free radical-induced damage.

Anti-inflammatory Activity

The essential oil and phenolic constituents of nutmeg exhibit potent anti-inflammatory effects by suppressing the production of inflammatory mediators such as prostaglandins, nitric oxide, and pro-inflammatory cytokines.

Antimicrobial Activity

Eugenol, myristicin, and terpinene disrupt microbial cell membranes and inhibit microbial growth.

Analgesic Activity

Nutmeg experimental studies indicate that its essential oil may reduce pain perception through modulation of inflammatory pathways.

Gastroprotective and Digestive Activity

Enhances gastrointestinal motility by strengthening the gastric mucosal barrier, reducing gastric acid secretion, and protecting against ulcer formation.

Hepatoprotective Activity

By reducing oxidative stress and enhancing endogenous antioxidant enzyme activity.

Neuroprotective Activity

Bioactive constituents such as myristicin and macelignan have shown neuroprotective effects by reducing oxidative stress and neuronal inflammation. Preliminary studies indicate potential benefits in improving memory, cognitive function, and protection against neurodegenerative disorders.

Antidiabetic Activity

Nutmeg extracts have hypoglycemic effects in experimental studies by improving insulin sensitivity, regulating glucose metabolism, and reducing oxidative damage associated with diabetes.

Memory enhancing activity

Parle et al. (2004) have investigated the effect as an administration of the nhexane extract of *M. fragrans* at the lowest dose of 5 mg/kg body weight for 3 successive days significantly improved the learning and memory level of young and aged mice. The extract said to have reversed scopolamine and diazepam-induced impairment in learning and memory of young mice.

Cardioprotective Activity

Experimental evidence suggests that it can reduce lipid peroxidation, improve lipid metabolism, and protect cardiac tissues from oxidative injury.

Immunomodulatory Activity

By regulating cytokine production and improving the activity of immune cells. This immunomodulatory effect may contribute to increased resistance against infections.

Anti-obesity Activity

Emerging evidence indicates that nutmeg extracts may influence lipid metabolism, reduce adipocyte formation, and improve metabolic parameters associated with obesity.

Insomnia

Nutmeg seeds increase the levels of serotonin that brings the relaxation of the body. (Pandey, 2005).

Wound Healing Activity

The antimicrobial, antioxidant, and anti-inflammatory properties of nutmeg support tissue repair and wound healing.

Piles relieving

Piles are cured by applying nutmeg past mixed with Vaseline.

Aphrodisiac Activity

In traditional medicine, nutmeg has long been regarded as an aphrodisiac.

THERAPEUTIC POTENTIAL OF JATIPHAL:

Potential treatment for diabetes

Its bioactive compounds may improve insulin sensitivity, regulate blood glucose levels, inhibit carbohydrate-digesting enzymes, and protect against diabetes-related complications.

Potential neuroprotective agent in Alzheimer's disease

By Amyloid-Beta Reduction: Preclinical studies suggest that extracts from nutmeg may help reduce the buildup of neurotoxic amyloid-beta plaques. These properties suggest that it may help improve cognitive function and reduce neuronal damage associated with Alzheimer's disease.

Adjunct in cancer therapy

The antioxidant activity of Jatiphal may help neutralize reactive oxygen species (ROS), thereby reducing oxidative DNA damage and chronic inflammation, both of which contribute to carcinogenesis. In addition, its anti-inflammatory effects may suppress the production of pro-inflammatory mediators that promote tumor development.

These actions may enhance the overall effectiveness of conventional anticancer therapies while potentially reducing certain adverse effects associated with chemotherapy and radiotherapy.

Management of inflammatory disorders

It is rich in active volatile oils like *eugenol*, *myristicin*, and *pinene*, which work together to reduce swelling, ease muscle soreness, and calm localized inflammation.

Protection against liver diseases

Due to its potent antioxidant and anti-inflammatory properties. Studies suggest that specific active compounds, such as *myrislignan*, help shield the liver from oxidative stress and injury.

Cardiovascular health benefits

By blood Pressure Regulation: Jatiphal contains potassium and copper, which act as natural vasodilators. By Cholesterol Management: Studies suggest that regular, moderate consumption of nutmeg can help lower bad cholesterol (LDL) and triglyceride levels, reducing overall risk factors for heart disease.

DISCUSSION

The present review highlights the considerable therapeutic potential of *Myristica fragrans*, which has been recognized in both traditional medicine and modern scientific research. Historically, nutmeg has been widely used to improve digestion, stimulate appetite, relieve gastrointestinal discomfort, treat respiratory disorders, and enhance reproductive health. Scientific studies have identified several important phytochemicals, including myristicin, trimyristin, myristic acid, elemicin, safrole, lignans, and neolignans, that contribute to its medicinal properties. Despite these promising findings, the majority of available evidence is based on experimental and preclinical studies. Further clinical research is essential to validate these therapeutic benefits, determine optimal dosage, and establish the long-term safety profile of *M. fragrans* for human use.

CONCLUSION

Myristica fragrans is an economically and medicinally important evergreen plant of the Myristicaceae family. Its two major products, nutmeg (seed) and mace (aril), have been widely used as culinary spices and traditional herbal remedies for centuries. The plant is a rich source of biologically active phytochemicals, such as myristicin, elemicin, lignans, terpenoids, and essential oils, which are responsible for its broad spectrum of pharmacological effects. Scientific investigations have demonstrated that *M. fragrans* possesses antioxidant, antimicrobial, anti-inflammatory, antidiabetic, hepatoprotective, neuroprotective, anticancer, and several other therapeutic activities. In conclusion, *Myristica fragrans* remains a promising medicinal plant with considerable potential for future pharmaceutical and nutraceutical development.

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