

A REVIEW ON MYRISTICA FRAGRANS HOUTT. WITH UNANI PERSPECTIVE AND MODERN PHARMACOLOGY

¹Kunwar Alam Choudhary, ²Azhar Jabin, ^{*3}Mohd Aleem, ⁴Fasihur Rehman Ansari

¹PG Scholar, Dept of Moalajat, School of Unani Medical Education and Research, Jamia Hamdard, Delhi (India)-110062.

²Assistant Professor, Dept. of Moalajat, School of Unani Medical Education and Research, Jamia Hamdard, Delhi (India)-110062.

³PG Scholar, Dept of Ilmul Advia, National Institute of Unani Medicine, Bangalore, (India)-560091.

⁴Assitant Professor, Dept of Moalajat, Rajasthan Unani Medical College and Hospital, Jaipur (India)- 302004.

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*Corresponding author: Mohd Aleem

PG Scholar, Dept of Ilmul Advia, National Institute of Unani Medicine, Bangalore, (India)-560091.

ABSTRACT

Myristica fragrans (M. fragrans) Houtt is an evergreen tree indigenous to India, Indonesia and, Srilanka. It is the main source of spices; nutmeg and mace. Mace used as a tropical spice having a pleasant aromatic fragrance, for this property it has been used widely as flavoring agent in cakes, pudding, beverages, meat, and sausages. Besides this, it has a special ability to enhance the taste of food. Myristicin (5-allyl-1-methoxy-2,3 (methylenedioxybenzene) constituent is responsible for flavoring property and also been known to produce important psychopharmacological responses. It has been known to provide many medicinal properties due to its complex molecular structure. The chemical constituents of M. fragrans have been studied for hypocholesterolemic hypolipidemic, antidepressant, aphrodisiac, antimicrobial, memory enhancer, antioxidant and hepatoprotective properties. A thorough literature review reveals that M. Fragrans deserves more attention from the scientific community and public health specialists to explore its full array of benefits to society's welfare.

KEYWORDS: *Myristica fragrans*, nutmeg, mace, Myristicin, literature review.

1. INTRODUCTION

The Greco Arabian system of medicine originated from Greece and the word Unani derives from 'Unan' which is a Greek Urdu transformation. It is best to refer to it as Greco-Arabic medicine as it is the upshot of original Greek medicine produced during the Arab civilization.^[1] This system is constructed on the Hippocratic theory of humours viz. blood, phlegm, yellow bile, and black bile, and the four qualities of states of the human body like hot, cold, moist and dry. The Arabian physician put the Greek ideas as seven principles (*Umoor-e-Tabbiya*), including element (*Arkan*), temperament (*Mizaj*), humor (*Akhlat*), organs (*Aaza*), spirit (*Arwah*), faculties (*Qowa*) and functions (*Afaal*). In this system, these principles are believed to be responsible for the constitution of the body and its health, as well as for diseased conditions.^[2] Herbal and natural products have been used for varying purposes for centuries. In recent decades, plants yielding essential oils and other extracts as sources of natural products have gained attention and scientific interest.^[3] *Myristica fragrans* Houtt., belongs to the family

Myristicaceae and commonly known as Jaiphal and Javitri in India. It is the source of two spices, nutmeg, and mace. Nutmeg is the seed kernel inside the fruit and mace is the net-like covering (aril) over the kernel of fleshy red in color. It is an evergreen aromatic tree of a dioecious or monoecious type typically growing to 5 to 13 meters high, rarely 20 meters.^[4,5] These agents have been used since a pretty long time and there is enough evidence showing their use by the ancient Greek and Arab physicians e.g. Hippocrates (460 B.C), Dioscorides (70 A.D), Raazi (926 A.D), Ibn-e-Sina (1038 A.D) etc.^[6] The term *Myristica fragrans* was derived from the Latin word "Nux Muscat", used for musky or scented nut. The folklore claims that the musky aroma causes the paradise birds to land on the ground. This outlandish phenomenon is probably due to observing its narcotic property. But the pleasing aroma and taste make this spice very famous to be used in sweets, desserts, or any suitable savoury dishes.^[7] Scientists from various disciplines have studied the chemical constituents of M fragrans for hypolipidemic and hypocholesterolemic effects, antimicrobials, antidepressants, aphrodisiacs, memory

enhancing, antioxidants and hepatoprotective property.^[8] For centuries Nutmeg has been used all over the world as a valuable spice. Nutmeg has also been used in traditional remedies for stomach and kidney disorders along with its use in flavor enhancer of foods and beverages. The effects of nutmeg on the central nervous system and its antimicrobial and antioxidant effect were also reported in literature.^[9]

2. Scientific Classification



Kingdom: Plantae
Division: Tracheophytes
Class: Magnoliopsida
Order: Magnoliales
Family: Myristicaceae
Genus: *Myristica*
Species: *M. fragrans* Houtt

3. Distribution

An evergreen aromatic tree that is native to Moluccas Island and India.^[10]

4. Botanical Description

There are about 300 species belongs to the genus *Myristica*.⁵ Among these two species have been produced in India; *Myristica malabarica* and *Myristica canarica*. The most precious variety i.e., *Myristica fragrance* belongs to Indonesia.^[7] The plant is mainly of dioecious or rarely monoecious evergreen type, height is usually 10-20 m with dispersing branches carrying oblong-ovate shaped leaves; 5-15 cm long, 2-7 cm wide and acute at apex and base, dark green colored of feathery and lustrous in touch. The inflorescence of *M. fragrans* is an axillary raceme. It is a simple cyme in the female plant but branched in the male plant. Flowers are fragrant, creamy yellow-colored, and of drooping structure. Flowering was observed throughout the year in male trees whereas for seven months continuously in female trees. Highest flowering period in both the cases was of July followed by October. The trees, male or female, do not give flowers until they are up to 9 years old; they continue to do so for another 75 years once they start flowering. The lemon-like yellowish fruit contains the seed wrapped in a reddish spongy net-like tissue known as the aril or arillus. In seed, the testa, tegmen, and aril have a massive vascular supply. The endosperm is starchy and sticky. The aril (mace) is more horny,

fragile, and yellowish-brown when dried and bright scarlet when fresh.^[9,5]

5. Cultivation

It is cultivated in all parts of Kerala, Karnataka, Tamil Nadu, Assam, Goa, Andaman, and the Nicobar Islands. India producing approximately 11,424 tonnes of spice in an area of 15, 131 ha. And imports 1325 tons of nutmeg, and 265 tons of mace.^[5] *Myristica fragrans* require a moist, warm, and rainy tropical climate with an average temperature of 25-30 ° C and with no real dry periods. The types of soil on which nutmeg is grown vary greatly. They vary from sands to loam soils. The best soils tend to be from volcanic origin.^[11] A nutmeg tree takes about 20 years to achieve its full potential but the first harvest can take place 7 to 9 years after planting. The trees bear two to three crops per year.^[4]

6. Description In Unani Literatures

It is made up of peel, flesh, seed, and mace. The kernel within the seed is called Jaiphal (Nutmeg) and mace is the net like skinny covering known as aril over a kernel of fleshy red color. This covering is removed from it after drying and Commonly known as Javitri, or Bisbasa. Javitri's shelf life is 3 years, and the taste is astringent type. It is of green color when fresh but maybe reddish or yellow after drying.^[12,13]

7. Vernacular Names

Urdu: Javit, Hindi: Japatri, English: Arillus of the nutmeg, Arabic: Bisbaasa. Persian: Jouzbawwa, Bengali: Japatri, jotri, Gujarati: Jayapatri, Malayalam: Jadipalliol, Kannada: Jaapatri, Tamil: Japatri, Telgu: Jadipattiri.^[14,15]

8. Temperament

Mizaj (temperament) is one of the fundamental components of the Unani system of medicine. The *Mizaj* of drugs have been expressed in terms of four *kaifiyat* (qualities) viz. *har* (hot), *barid* (cold), *yabis* (dry) and *ratab* (moist).^[16]

9. Pharmacological Action

Muqawwie meda, *Muqawwie bah*, *Muhallile waram*, *Muqawwie jigar*, *Muteebe dahan*, *Muqawwie qalb wa dimagh*, *Mufarraah*, *Dafae ta'ffun*, *Muqaawwie aasab*, *Daafae sual*, *Kasire riyah*.^[17]

10. Therapeutic Uses

It is used in *Amraze qalb*, *Sue hazm*, and *Zaufe bah*. It removes the secretion from the lungs, so it beneficial to the lung disorders.^[13] It is *Muqawwie wa Muharrike* bah hence been used in *Muajeen* preparations with an aphrodisiac effect. Used as a masticatory in foul mouth odor due to *Qulae fam* or stomach disorders.^[17] Mace is used as herb in cooking preparations or in medicine as well. It is used in choleric diarrhoea especially when roasted, in Rheumatism and, also in the obstruction of liver and spleen. It is also an ingredient of the Unani compound preparation *Habbe Mumsik* used for the

treatment of excessive nocturnal emission and also very effective in *Salasul bol*.^[18]

11. Adverse Effect (Mazarrat) And Corrective (Musleh)

Some of the drugs have interesting pharmacological activity but can also produce harmful effects due to their inherent property, so to improve their therapeutic effect these agents are subject to certain corrective measures (*Islah-e-Advia*), as described in Unani literature.^[19] However, if it is not possible to implement corrective measures on the drug then another drug that serves as a corrective agent (*Musleh*) is either admixed or used in conjunction with the first drug to minimize its likely undesirable effects. It has been described that *Myristica fragrans* cause headaches. Therefore, *Babool* gum (*Acacia nilotica*), *Sandal* (*Santalum album*), *Arqe Gulab*. are used as corrective agents to reduce the harmful effect.

12. Alternative or Substitute (Badal)

When a drug is prescribed in place of drug of choice, it is named as a substitute. Unani drugs are substituted when they are endangered, pricey, scarce, banned, or difficult to procure. A drug is given as a substitute only for a precise action, as the substitute could differ from the main drug in other actions. The substitute of mace "javitri" is seed's kernel "Jaiphal".^[13,14]

13. Dosage: 1-3 gm.

14. Compound Formulations

Jawarishe Zarooni sada, Habbe azaraqi, Jawarishe Bisbasa, Jawarishe Zanjabeel, Habbe Jadwar, Habbe Mumsik, Laboobe Kabir.^[20]

15. Phytochemistry

The main constituents of *M. fragrans* are alkyl benzene derivatives (myristicin, elemicin, safrole, etc.), terpenes, alpha-pinene, beta-pinene, myristic acid, and trimyristin.^[4] Myristicin (5-allyl-1-methoxy-2,3 (methylenedioxy benzene) is a flavoring plant constituent and has been known to produce significant psychopharmacological responses.^[21] Mace contains a volatile oil 8-17 %, a fixed oil, resin, fat, sugar, destrin, and mucilage. The essential oil of mace is yellowish with the odor of mace and consists of macene.

Organic- Fats, phenols, terpenoids, alcohol, saponins, resins, and carbohydrates.

Inorganic- Aluminium, strontium, calcium, magnesium, sodium, potassium, sulphate and phosphate.^[14,20] Both nutmeg and mace contain about 2% of lignans (diarylpropanoids), which are non-volatile dimers of phenylpropanoid constituents of the essential oil, e.g. dehydrodiisoeugenol. The main glycoside is trimyristin having anxiogenic activity.^[4]

16. Pharmacological Studies

16.1 Antihyperlipidemic Activity

The ethanolic extract of (*M fragrans*) was studied in albino rabbits for its effects on experimentally induced hyperlipidemia. After inducing hyperlipidemia in 12 rabbits a dose of 500 mg/kg of the extract was administered orally daily for 60 days in 6 rabbits (experimental group). Total cholesterol: HDL ratio and LDL: HDL ratio was significantly lower in the experimental group. The *Myristica fragrans* extract showed platelet anti-aggregatory ability. There were significantly lower levels of total cholesterol in heart (3.7 +/- 0.5 vs. 2.2 +/- 0.5 mg/100 g) and liver (11.9 +/- 1 vs. 1.5 +/- 0.4 mg/100 g).^[22,23]

16.2 Anti-inflammatory Activity

The methanol extract (1.5 g/kg), ether fraction (0.9 g/kg), n-hexane fraction (0.5 g/kg), Fr-II (0.19 g/kg) and Fr-VI (0.17 g/kg) showed a lasting anti-inflammatory activity, and the potencies of these fractions were approximately the same as that of indomethacin (10 mg/kg). Fr-VI was determined to be myristicin. These results suggest that the anti-inflammatory action of Mace is due to the myristicin that it contains.^[24]

16.3 Anti-Cancer

Mace is reported for the reduction of induced carcinogenesis in the uterine cervix in mice.^[25]

16.4 Chemo-preventive Activity

Mace is reported as chemoprevention of chemically induced carcinogenesis.^[26]

17. CONCLUSION

Myristica fragrans have been used for the treatment of various ailments in the Unani System of Medicine for a long period. It has been used as a common ingredient in many Unani compound formulations.

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