

## Chapter 4

# Elucidating the Phytochemical and Pharmacological Potential of *Myristica fragrans* (Nutmeg)

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### ABSTRACT

*Myristica fragrans* or nutmeg is a ground spice of the family Myristicaceae. Its tree has dark leaves mainly cultivated in Grenada, Malaysia, and Kerala. It is majorly a source of two spices derived from its fruit: nutmeg (jaiphal) from its seed and mace (javitri) from the covering of seed. The important bioactive constituents present in nutmeg include macelignan, carvacrol, myristicin,  $\beta$ -caryophyllene,  $\beta$ -pinene,  $\alpha$ -pinene, *p*-cymene, and eugenol. Low doses of nutmeg do not cause any side effects whereas after consuming 5g toxic overdose occurs, and central nervous system (CNS) effects were induced after consuming 1 to 2 mg/kg b.wt. of nutmeg. Various therapeutic or medicinal applications were shown by nutmeg such as antioxidant, antimicrobial, aphrodisiac, anticancer, hepatoprotective, anti-inflammatory, antidepressant, and cardioprotective activity. This review chapter focuses on ethnobotany, phytochemistry, acceptable daily intake, and different pharmacological actions of this medicinal plant.

### INTRODUCTION

The term 'Myristica' was derived from Greek term 'Myron', meaning a sweet liquid cleansed from the plant (Everett, 1981). "Myristica" is a genus having nine species and few are most commonly found in India, such as *Myristica fragrans*, *Myristica malabarica*, and *Myristica beddomeii*. The common name of *Myristica fragrans* is known as nutmeg, which belongs to Myristicaceae family. The two important condiments mainly recognized for their production are nutmeg and mace. (Krishnamoorthy and Rema 2001). The seed present inside the fruit is nutmeg, and the delicate red coating on the kernel is mace (Pal et al., 2011), as shown in figure 1. It is the native of East Indonesia, formally known as 'spice islands'. Later, it is broadly distributed in India, North Australia, Srilanka, Pacific islands, and South East Asia.

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In India, nutmeg is chiefly cultivated in southern parts, mostly in Tamil Nadu. It is a medium-sized, evergreen aromatic tree, usually growing to about 5 to 13 m high, even up to 25m.

*Figure 1. Diagram of different parts of ground spice Myristica fragrans or nutmeg*



Nutmeg is considered as an important spice all over the world and is used to enhance the taste and aromatic flavor of the food. It is a unique culinary ingredient frequently used in bakery foods, confections, puddings, meats, sausages, sauces, vegetables, and beverages.

Nutmeg is utilized as a folklore medicine since the middle ages in the treatment of many health issues like stomachic, appetite stimulant, diarrhea, and controlling flatulence (Min et al., 2011).

Studies report that essential oil obtained from nutmeg cures paralysis, infectious skin diseases, and rheumatism. The plant is also used for anti-inflammatory, analgesic, sedative, hypnotic, and antimicrobial actions (Kokate et al., 2010; Chelladurai et al., 2017).

An array of compounds have been identified in nutmeg through phytochemical analysis such as phenolics, flavonoids, carotenoids, alkaloids, lignins, and terpenoids, which are mainly responsible for their therapeutic and pharmacological applications (Saxena and Patil, 2012). The nutmeg is a bitter aromatic astringent, and chemical analysis showed the presence of volatile and non-volatile compounds that give the characteristic pleasant fragrance and aroma. The aim of this review article is to sum up the pharmacological/biological activities of nutmeg and its bioactive constituents with possible therapeutic applications.

### **Taxonomical Classification (Forrester, 2005)**

Kingdom: Plantae  
Division: Magnoliophyta  
Class: Magnoliopsida  
Subclass: Magnoliidae  
Order: Magnoliales  
Genus: *Myristica* Gronov  
Family: Myristicaceae  
Species: *Myristica fragrans*

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