



# The Review On Myristica Fragrance And Its Pharmacological Activities

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**Abstract :** The annual spice Myristica fragrans belongs to the Myristicaceae family. It is grown all throughout the world and used in traditional remedies, essential oil implementation, and food flavouring and also for provide fragrance. The majority of nutmeg accommodates various volatile oils, myristicin, terpenes and phenylpropanes. In the creation of medications for flatulence, nausea, dysentery, and stomach aches, nutmeg plays an important role. Nausea, early leprosy, malaria, rheumatism, and vomiting Nutmeg's oleoresin's chemical makeup and antifungal properties. Due to the presence of various chemical constituent and volatile oils it shows various pharmacological activities which are antibacterial, hypoglycemic action, hypolipidemic and platelet action, hepatoprotective action, anti-inflammatory action, anti-cancer action, memory intensity action, anti-diarrhoeal action, anti-depressant action, anti-oxidant action, anti-microbial action.

**key words** - Myristica, myristicin, volatile oils, terpenes, phenylpropanes, pharmacological action.

## 1.INTRODUCTION

The Myristica fragrance plant which is also called as "Nutmeg" or "mace" is belonging to the family myristicaceae. There are two important parts of the Myristica fragrance fruits are the shelled seed which is flesh and the red aril is mace that surrounds the seed which having unique fragrance and a slight sweet warm taste. The seed of this family has inner red brown colour kernel called as Nutmeg and the outer ariles are known as Mace. Myristica fragrance is well known species for flavouring many food products, formulation, perfume and balm. The breed Myristica comprise of about 150 breed spread In the western pacific and Asia, Nutmeg is the embryo core Inner the fruit and mace is the obese red net like skin belying on the core. Fruit part of the tree consist the 70% flesh, 13% seed, 5% shell and 4% mace. Since oil is found in greater quantities in the seeds than in any other part of the plant, the essential oil derived from seed was used for the study. Typically, seeds have an oil content of more than 60%.

The nutmeg was discovered in 1512 by Portuguese and it originated from Banda Islands of Indonesia and after the Dutch propagated it's importance. The name nutmeg comes for a Latin word "nux Muscata" means "Musky nut".

In 1774 the Dutch botanist Maartyn Houttuyn gives the name Myristica fragrance which is a binomial name. It has previously been described, among others, by Georg Eberhard Rumphius.

The Myristica fragrance is used in various traditional medicine system the parts of plant used to treat the various diseases .which can use as carminative, stimulant, narcotic, emmenagogue and abortifacient. In Indian Ayurvedic systems of medicine the nutmeg is used to treat anxiety, nausea, diarrhea, cholera, stomach cramps, parasites, paralysis, and rheumatism, aphrodisiac. The mace has a pungent bitter taste that's why it is used in bronchitis, thirst and also improve appetite.

In Pakistan traditional medicine system the nutmeg is used to treat the hypertension.

In Unani medicine system it is used in various diseases like cardiac diseases (Amraz-e-Qalb), indigestion (Sue Hazim) and sexual debility (Zofe Bah).. It is helpful for lung problems because it eliminates secretion from the lungs. Because it has an aphrodisiac effect, Muqawwie wa Muharrike bah is utilised in muajeen recipes. Used as a masticatory in cases of bad breath brought on by stomach or Qulae fam conditions.

In Traditional Chinese medicine system (TCHs) the Myristica fragrance is used in the treatment of Benign prostate hyperplasia (BPH) diarrhea, muscle spasm, rheumatism dysentery and rheumatic pains and can be used as insect repellent.

The Myristica fragrance is widely used in the treatment of various disease. It is used to treat flatulence, aid digestion, improving the appetite and treatment in diarrhea vomiting and nausea, Inflammation is the most common symptom for most of the diseases.

It consists of most important chemical constitute. Nutmeg seed contains essential oil, fatty oils resins ,wax and other components. The essential oil yield of Myristica fragrance of leaves 0.7- 3.2, mace 8.1-10.3, seed 0.3-12.5, kernel 6.2-7.6%. The majorly found chemical constitute of MFEO are myristicin ,eugenol, sabinene,  $\beta$ -myrcene, and  $\alpha$ -pinene, limonene and safrole. Techniques were used to extract the MFEO Hydrodistillation, steam distillation, supercritical fluid extraction, microwave, and ultrasound-assisted. The Myristica fragrance has various pharmacological Actions which are anticancer, antidepressant, antidiabetic, antiobesity, anti-inflammatory, analgesic, antimicrobial, antioxidant, Hepatoprotective, anticonvulsant and memory enhancing.

## 2. Vernacular Names

Table 1 vernacular Names

<b>English</b>	Nutmeg
<b>Hindi</b>	Jaiphal, Javitri, malti phal
<b>Sanskrit</b>	Jatisaya, Jati-phalam, malathi-phalam
<b>Assamese</b>	Kanivish, Jaiphal
<b>Bengali</b>	Jayphala, jaepatri,
<b>Burma</b>	Zadi-phu
<b>Gujrati</b>	Jaiphala, javantri
<b>Kannda</b>	Jadikai, jaykar, jajakai
<b>Kashmiri</b>	Jafal, zafal
<b>Malayalam</b>	Jatika, bush.
<b>Marathi</b>	Jaiphal
<b>Panjabi</b>	Jaiphal
<b>Tamil</b>	Sathkhai, jathikkai, jadikkay,
<b>Telugu</b>	Jajikaya
<b>Urdu</b>	Jauzbuwa, jaiphal
<b>Arabic</b>	Jowz buwwa, jouz-ul-teeb, Jainsi ban
<b>Armenian</b>	Meshgengouz, Mshkenkoyz,
<b>Chinese</b>	Rou-dou-kou
<b>Dutch</b>	Nootmuskaat, muskaatnoot
<b>French</b>	Muscadier, musque
<b>Greek</b>	Moschokarido
<b>German</b>	Achter muscatnussbaum
<b>Hebrew</b>	Egos Muscat, egoz musqat
<b>Italian</b>	Noce moscata
<b>Indonesia</b>	Pala
<b>Latin</b>	Merisiniae
<b>Oriya</b>	Jaipholo
<b>Persian</b>	Joubawwa
<b>Russian</b>	Opex muskatnyi orekh

<b>Sindhi</b>	Jafar ,jadika
<b>Spanish</b>	Moscada, nuezmoscada
<b>Turkish</b>	Hindistancevizi
<b>Unani</b>	Fuqlaj, moschokarido

### 3. Morphology

The spice tree *Myristica fragrance* is a large evergreen plant that well grown under tropical warm and humid climates . with elevations of 1000 m above sea level with 150 to 250cm rainfall . It usually grow up to 5-15 m (16-49 ft.) tall. But occasionally it reaching 20 m-30m (66-98 ft.) on Tidore with greyish brown soft bark.. The leaves are arranged alternative having dark green colour with (0.8-2.8 in.) Wide and having petioles about 1cm. (0.4 in.) Long . The nutmeg fruit has a fleshy husk. When ripe the husk splits into two halves along a ridge running the length of the fruit. Inside is a purple-brown shiny seed, 2-3 cm (0.8-1.2 in) long by about 2 cm (0.8 in) across, with a red or crimson covering (an aril) .The seed is closely covered with crimson red colour lacy by or thread like ariles known as Mace .Both spices have a similar warm sweet and aromatic flavor. The *Myristica fragrance* are dioecious or accasionally monoecious where the dioecious species i.e. male or staminate flowers and female or carpellate flowers are born on different plants. The Be i.e. Nutmeg is roughly oval, egg or shears shaped having 6-9 cm.(2.4-3.5in.) Long and 3.5-5 cm (1.4-2.0 in ) Wide with weight between 5 to 10 gm.(dried). The mace is the dried “lacy” reddish covering or aril of the seed.. The flowers are bell-shaped, pale yellow and somewhat waxy and fleshy. Staminate flowers are arranged in groups of one to ten, each 5-7 mm (0.2- 0.3 in) long; carpellate flowers are in smaller groups, one to three, and somewhat longer, up to 10 mm (0.4 in) long.

### 4. Taxonomical classification

<b>Kingdom</b>	Plantae – Planets, Planta, Vegetal plants
<b>Subkingdom</b>	Viridiplantae – Green plants
<b>Infrakingdom</b>	Streptophyta –Lland plants
<b>Superdivision</b>	Embriophyta
<b>Division</b>	Tracheophyta – Vascular plants, tracheophytes
<b>Subdivision</b>	Spermatophytina – spermatophytes , seed planrs, phanerogames
<b>Class</b>	Magnoliopsida
<b>Superorder</b>	Magnoliana
<b>Order</b>	Magnoliana
<b>Family</b>	Myristicaceae
<b>Genus</b>	<i>Myristica</i> Gronov
<b>Species</b>	<i>Myristica fragrance</i>
<b>Common name</b>	Nutmeg

### 5. Ecology

For the *myristica fragrance* it required warm and humid tropical climate, with average temperatures of 25-30°C and average annual rainfall of 2000-3500 mm without any real dry period. Flowering can be adversely affected by temperatures above 35°C and by hot dry winds. Therefore, in the tropics the crop can only be grown below 700 m altitude. The superficial root system makes the tree very susceptible to wind damage. The crop can grow on any kind of soil provided there is sufficient water but without any risk of waterlogging. Preferred soils are those of volcanic origin and soils with a high content of organic matter with pH 6.5-7.5.

## 6. Geographical sources

Myristica fragrance is native to southern Molaccan Islands of Indonesia where it is originated in Ambon and Banda. It is extensively distributed and grown in Grenada, India, Shrilanka and the USA. It is widely grown across the tropics including Guangdong and Yunan in China, Taiwan, Indonesia, Malaysia, Grenada in the Caribbean, Kerala in India, Shrilanka and Southern America.

## 7. Chemical composition

The Myristica fragrance consists of various important chemical constitute and essential oil. The essential oil of Myristica fragrance is colourless to light yellow liquid which having spicy aromatic odour. The essential oil yield of Myristica fragrance of leaves 0.7- 3.2, mace 8.1-10.3, seed 0.3-12.5, kernel 6.2-7.6%. The major constituents in the essential oil of nutmeg contain Myristicin, elemicin, safrole and sabinene which Comprise 80% of the oils. The nutmeg oils showed 85to93% monoterpene hydrocarbons, 6.6to12% oxygenated monoterpenes and sesquiterpenes and 3.5% aromatic ethers, while the for the mace oils 75-94% coincide values, 4.7-17%k pepper, carrot, common fennel, mace, nutmeg, sweet fennel, many congenital oils and flavoring. The Kernel contains 30-55% oil and 45-60% solid matter, the volatile oil accounts for 5-15% of the nutmeg kernel, and for fixed oil accounts for 24-40%. Pepper, carrot, common fennel, mace, nutmeg, sweet fennel, many congenital oils and flavoring agents.

The important constituents of Myristica fragrans have been confirmed to be alkyl benzene derivatives e.g. Myristicinelemicin, safrole, etc essential. The kernel contains about 10% essential oil., which is widely elemicin, in the kernel of M. fragrans is one of the cause for its intoxicating effects et al. terpinene, limonene, myrcene (60% to 90%), terpene derivation (linalool, geraniol, terpineol-5% to composed of terpene hydrocarbons (a-pinenes, camphene, p-cymene, sabinene, b-phellandrene, and phenylpropanes (myristicin, elemicin, safrole-2% to 20%). The existence of myristicin and Gopala Krishnan (1992) has chart of chemical constituents with their therapeutic activity Honey Jose et al Besides, the kernels consist of various saponins, polyphenols, tannins, epicatechin, triterpenes sapogenins and fats. Nutmeg has also been reported to contain calcium, phosphorous, iron, thiamine, riboflavin and niacin. Chromatography of the nutmeg take out revealed the attend of epicatechin and cyaniding. Mace has tear gas containing 1% chloracetophenone (CN) gas in a solvent of sec-butanol, propylene glycol, cyclohexene, and dipropylene glycol methyl ether; some formulations also include oleoresin Capsicum.

The major constituents of leaf were sabinene, eugenol, myristicin, caryophyllene, and  $\beta$  myrcene. Sabinene,  $\alpha$  pinene,  $\beta$  pinene, d limonene, and 3 carene were predominant constituents of mace. The major constituents of the kernel and seed were sabinene,  $\alpha$  pinene,  $\beta$  pinene, d limonene, and  $\beta$  myrcene.

## 8. Pharmacological Actions

- 8.1. Anti-bacterial Action
- 8.2. Hypoglycemic Action
- 8.3. Hypo-lipidemic and platelets Action
- 8.4. Hepatoprotective Action
- 8.5. Anti-inflammation Action
- 8.6. Anti-cancer Action
- 8.7. Memory intensity Action
- 8.8. Anti-diarrhoeal Action
- 8.9. Anti depressants Action
- 8.10. Anti-oxidant Action
- 8.11. Antimicrobial action

### 8.1) Antibacterial Action

The antibacterial activity of the volatile oil acquired from the kernels of Myristica fragrance was examined in a study which consist of various bacterial strains and it was determined that it was equally efficacious against the bulkiness of gram positive and gram negative microorganism. Essential oil acquired from Myristica fragrance kernel having the extension restraint ability of bacterial spores and useful as an food preservatives. It has been determined experimentally that take out from the dried kernel seal of nutmeg has two composition which shows the antioxidant powerful antifungal activity and antibacterial activities. It has been determined experimentally and demonstrated that Myristica fragrance has the strong antimicrobial activity. It also useful as preservatives antiseptic and disinfectant. In further study, it was set up that ethyl acetate take-out of the flesh of Myristica fragrance had the powerful bactericidal activity oppose to some cariogenic Gram positive and Gram negative bacteria. In a study, a number of frequently utilize pieces were assess for antifungal activity and turmeric and nutmeg were established to be almost energetic Antifungal combination were separated from Myristica fragrance, which were derived of neoligans and eugenol.

### 8.2) Hypoglycemic and antidiabetic Action

It was determined that when rats were treated with the pre-treatment with the agent petroleum ether (60-80 C) remove of Myristica fragrance, at dose of 200 mg kg, a notable reduce in blood glucose level, (P005), Was acquired, Le blood glucose level lower born 145.7549.65 51403 mg% in vest glucose tolerance test (OGT) after 30 min contrast to Sway group fed rats In Allison convince diabetic rats, when petroleum ether take out of Mrio was specified daily for couples of week, the blood sugar level reduce table from 326.25-7.05 10 268.0.6 mg %. The nutmeg take out has signal peroxisome proliferator-activated receptor (PPAR) / dual agonist performance, but its vigour is less the PPAR and PPAR  $\gamma$  full agonist Therefore, nutmeg (Myristica fragrance) take out being a dual agonist PPAR can be evolve as a potential anti-diabetic agent for the therapy of type 2 diabetes

### 8.3) Hypolipidemic and platelets anti-aggregatory Action

The Hypolipidemic and platelets anti-aggregatory undertaking of the take out of kernel of Myristica fragrance were deliberate in albino rabbits. It was perceive that ethanolic withdraw of Nutmeg, at an oral administration of 500 mg/kg for 60 d. in albino rats, remarkably lower the complete cholesterol in heart and liver. Low-density lipoproteins (LDL) level low-density lipoproteins (VLDL) levels were also noticeable lower. The high-density lipoprotein (HDL) cholesterol was Enlarge, but it was not remarkable The total

cholesterol: HDL. Ratio and LDL: HDL ratios were remarkable lower in the act towards brute contrast to power I group. The virulent study that there is absolutely not unpropitious effect on various hematological and biochemical parameters. It also been revealed platelets anti-aggregatory undertaking. The pip take out of *Myristica fragrans* when operate hypercholesterolemic rabbits, noteworthy lower serum cholesterol & LDL cholesterol and upraised the lower LDI: HDLratio. It also the aggregation of phospholipids, triglyceride and cholesterol in heart, aorta and liver and assist in the Cessation of athermanous plaque in the aorta eradication of cholesterol and phospholipids through faecal matter was developed notable; in rabbits fed with kernal extract out.

#### 8.4) Anti-carcinogenic and Hepatoprotective Action

*Myristica*, the premier combination, in *Myristica fragrans* has potential to Impede the Lipopolysaccharide plus d-galactosamine persuade improvement of antibody TTNF- $\alpha$  centralise in mice consequently it was counsel that of *Myristica* venture Perchance be de to the hampering of cancer decrease factor (TNF)- $\alpha$  free from macrophages. Mace in so enclose hepatic detoxification system convince a Pursuit a study control Lenitive effects of a areca nut was convey out by Regulate the levels of enzymes of the hepatic detoxification system pursuit a study control lenitive effect of areca nut cytochrome P-450, cytochrome b5, glutathione S-transferase (GST) and it was windup that areca nut reduces the mace-induced enlarge in hepatic sulfhydryl (SH) and GST levels and raised the levels of cytochrome P-450 and cytochrome 5enzyme. A additional contemporary education revealed that mace lignan isolated from *Myristica fragrans* had a Hepatoprotective upshot on cisplatin-convince hepatotoxicity in mice. In a further work, it was establish that nutmeg aqueous takeout had noteworthy Hepatoprotective and antioxidant pursuit. Against isoproterenol persuade hepatotoxicity and oxidative strain.

#### 8.5) Anti-inflammatory Action

The anti-inflammatory activity of *Myristica fragrans* was assessing carrageenan-induced edema in rats and acetic acid convince vascular penetrable in mice. It was determined to that the anti-inflammatory effect was about the same as that of Indomethacin. The results put forward that *Myristica* in attendance in mace in in charge of for anti-inflammatory action. The anti-inflammatory possession of *Myristica* strength be due to reticence of chemokines, cytokines, nitrous oxide and growth factors in double-stranded RNA (dsRNA) Restorative macrophages via the calcium pathway The methanol takeout from pip of *Myristica fragrans* Worn for the therapy of inflammatory illness also had interdict Result on nitric oxide (NO) production. In a further education ethanolic take out of nutmeg kernel be seen in high -inflammatory activity by impede the inflammatory cytokines and Nitric oxide manufacturing. Quercetin was establish to be the a active composite In charge of for the anti- inflammatory activity Many authors conclude anti-inflammatory activity of antigen as well as its oil equal to non-steroidal anti inflammatory drugs, pharmacological activities also showed by nutmeg oil But anti-inflammatory activity is shown only by petroleum ether extracts. The total extract of nutmeg activated an enzyme that is AMP-activated protein kinase enzyme (potential therapeutic target) for curing the metabolic syndrome including type- 2 diabetes and obesity's. Seven combination like tetrahydrofurogualacin 12.5-bis-aryl-3,4-dimethyltetrahydrofuranlignans *frangansinC1* saucernetindissl, nectandrinB, verrucosin dimethyl nectandrin a were separated from this extract as an active composition. Some of the separate combinations bring about effective AMPK increase in different C2C12 cells, at 5microM concentration, nutmeg and its active composition not only useful in the treatment of type-2 diabetes and obesity but also for the enlargement of agents other metabolic disorders.

#### 8.6) Anticancer Action

In one study. It was perceive that, on bald on indispensable oil of *Myristica* fin us concentrations to the Michigan Cancerfoundation-7 (MCF-7) breast cancer unit line and A-357 epidermal skin cancer unit line, there was cytotoxic result. The indispensable of nutmeg showed notable reticence on the enlargement of a colon cancer cell line differentiated Caco-2 cells) in an in vitro study. The methanol takeout of *Myristica fragrans* Houutt source cell death of Jurkat leukemia T cell line by implement require SIRT1 MRNA down regulation. It has been demonstrate that *Myristica fragrans* impede the dare growth microorganism using 20% of the tokeout The casing of the kernels of nutmeg has chemo inhibitory possession li remarkable lower the Prevalence of a skin papilloma in Swiss albino mice The inhibitory action of Nutmeg was studied on methylcholarthene-induced carcinogenesis in the uterine cervix in Swiss albino mice. After a dose of 10 mg/mouse/day for 90d there was a notable reduced in the enlarge of carcinoma. Ethanolic extract of *Myristica fragrans* was useful totes anti-cancer activity opposed to human cancer cell lines and it Be in view more than 70% growth reticence at a concentration of 100ug/ml.

#### 8.7) Memory intensify Action

The effect of *Myristica fragrans* takeout, on recovery ability of learning and remembrance, Were studied on aged and young mice in oppose to their disability persuade by scopolamine (0.4 mg/intraperitoneal) and diazepam (1 mg/kg intraperitoneal). N-hexane Takeout of *Myristica fragrans* was given orally for 3 consecutive days in three doses (5, 10, & 20 mg/kg) and begin with the dose of 5 mg/kgp, o, significantly ameliorate. The reminiscence and leaning of youthful bandaged mice. The implement of action was not evoke in these studies, but the authors be convinced that it is a mechanism based on the dopamerginic-cholinergic activities, anti-inflammatory and anti-oxidant of this plant. Alzheimer's disease is treated on the basis of anticholinesterase reticence by let fall the empirical decrease arising by lower cholinergic deficiency In one study, it was Start that a hydro alcoholic take out of Nutmeg did show notable (50%) reticence of acetylcholinesterase for the treatment".

#### 8.8) Anti-diarrhoeal Action

Crude suspension and petroleum ether take out of nutmeg were evaluated for anti-diarrheal activity and it showed a decrease in the mean number of loose stools and increased in the obesity period. The crude suspension of nutmeg showed's good anti-diarrheal effect.. In another study hexane soluble portion of ethanol extract of the dehydrated fruits and flowers of anti-secretory possession in the ileum of rabbit and guinea pig appose *Escherichia coli* enterotoxins Osteoblast proliferation enhance activity fragrance compounds have proven ability to simulate osteoblastic machilin from *Myristica fragrans* encourages Osteoblast segregation by activating p38 mitogen-activated protein (MAP) kinase. Other lignan like nectandrinB, mesodihydroguaiaeretic acid , MachilinF Jicarín B and icariin A from *M. fragrans* also shown action and have anabolic activity in bone metabolism.



### 8.9) Antidepressant Action

The n-hexane extract of *M. fragrance* kernel was studied in mice for its antidepressant effect like the forced swim test (FST) and the tail suspension test (TST) at 3 distinct oral doses 5, 10, and 20mg/kg body weight. The highly potent dose was established to be 10 mg/kg dose, as it shown a maximum reduced in the immobility of mice when comparison to petrol. Addition to this dose also shown similar strength to Imipramine (15 mg/kg) and Festine (20 mg/kg). Thus, the extract of nutmeg was competent to give remarkable antidepressant effect in mice, when assessed by TST and FST. The antidepressant effect of the meg kernel extract could be due to interchange with the dopaminergic, adrenergic and serotonergic systems.

### 8.10) Anti-oxidant Action

The antioxidant activity of MFEO can be dignified through testing chemical assays like DPPH (2,2-diphenyl-1-picrylhydrazyl), ferric reducing antioxidant power assay (FRAP), inhibition of lipid peroxidation, and bleaching of B-carotene. The nutmeg essential oil showed 88.7% inhibition in linoleic acid oxidation with an EC50 dosage of 181.4 µg/ml. Matulyte et al. noticed that pure MFEO and MFEO with 1% of magnesium aluminometasilicate had similar antioxidant activity for EO concentrations of 0.2-20%. Also, this study noted that antioxidant activity was increased in a dose-dependent manner. Antioxidant activity of some spices was comparison with a part food antioxidants like butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT) Propyl gallate, Anise Name Liquorice and shown good activity in the deoxyribose assay. Propyl gallate, Liquorice, Ginger and nutmeg rises the firmness of a part fixed fats such as olive, sunflower and com oil and oils such as margarine and butter as well prevents oxidation at 110 °C. The antioxidant activity of nutmeg was set up to be higher than BHT in the trolox equal to antioxidant capacity (TEAC) assay. In another study, it was reported that methanolic extract of nutmeg Kernel showed good antioxidant activity by methods of 1,1-diphenyl-2-picrylhydrazyl (DPPH) and ferric reduces antioxidant power (FRAP) due to high content of tannin, flavonoid and terpenoids. Acetone extract appear good antioxidant activity by the DPPH radical scavenging assay due to the appearance of several terpenoidlike sabinene, Myristicine and eugenol. Nutmeg Has the antioxidant activity due to the appearance different amalgamation consisting of B-caryophyllin and eugenol, have the hydrogen molecule in the allylic or henrylic place. Since it is relatively simple abstraction of a hydrogen from these Sectional groups, these amalgamations have high antioxidant activity. The abstraction of a hydrogen is done by peroxy radicals that build under oxidative stress to another view. A part of Eugenol in nutmeg favors the antioxidant possession by encouraging the endeavor superoxide dismutase, catalase, glucose-6-phosphate dehydrogenase, glutathione peroxidase and glutamine transferase enzymes. The amalgam having catechol like catechol as in caffeic acid are advised to be good antioxidants as they easily donate electrons or phenolic hydrogen to the acceptors, such as lipid peroxyl groups or responsive oxygen species. Cellist et al (2010) set up that lignan derivatives are advised as a class of amalgam that shows the antioxidant potential of nutmeg kernel. After absorption of lignan and their glycosides into the body, they are assimilated to generate biologically active amalgamation having catechol construction that are in charge of high antioxidant possession of nutmeg kernel.

### 8.11) Antimicrobial action

The essential oil and various extracts of aromatic plants have shown powerful antimicrobial activity against diversity of fungi as well as bacteria. Narasimhan et al (2006) determine the antibacterial activity by arranging chloroform extract of nutmeg against the both gram negative and gram positive bacteria. They set up Myristicin and Trimyristin are the main antibacterial combination extracted from nutmeg kernel. Researchers isolated three lignans (mesihydroguaiaretic acid, nectandrin-B and erythro-austrobailignan-6) showing antifungal activity, from the methanolic extract of nutmeg seeds. The involvement of wheat leaf rust and rice blast was repressed by these three lignans. Some combination like carvacrol, Thymine, α-Pentene and β-pinenes which are monoterpene hydrocarbons are also antimicrobial agents. They are advised to be implicated in membrane disruption. Carvacrol is another important combination for antimicrobial activity. Carvacrol works in the similar way as the other phenolic combination, which work through membrane eradication and the outcome will be the rise in inhibition of membrane to potassium ions and protons. α-Pentene, β-Pinenes, and β-caryophyllene are reported to be antimicrobial. They appear in essential oil of nutmeg. Some plant phenolics are also described for antimicrobial activity. Antifungal and anti-inflammatory activities of plant essential oil are in the appearance of β-caryophyllene which conclude modern of the member alum shows work antibacterial activity has been presumed that animni due to the minor and major both combination; while it is atentable that the major managed by other minor combination cymene works synergistically with cervical membrane.

## 9. Conclusion

By studying above review we conclude that the *Myristica Fragrance* is one of the useful herbal medicinal product which is used in various traditional medicinal systems. The *Myristica fragrance* consists of two important parts i.e. 'Nutmeg' and 'Mace'. It consists of various chemical constituents and essential oils. The important chemical constituents are myristicin, elemicin, safrole, terpinene, limonene, myrcene, etc. Due to this chemical constituent it shows various pharmacological activities which are antibacterial action, hypoglycemic action, Hypolipidemic and platelet action, hepatoprotective action, anti-inflammatory action, anti-cancer action, memory intensity action, anti-diarrhoeal action, anti-depressant action, anti-oxidant action, anti-microbial action.

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