Chilies and Nut meg

Dear Students, in to-day's lecture, we will discuss about "Chilies and Nut meg"

This episode deals with different types of Chilies and Net mug special reference to , **Chilies, bioactive compounds, health benefits, Nutmeg and medicinally important compounds.**"The fallowing points are highlighted,

Introduction:

A cash crop is an agriculture crop which is grown for sale to return a profit, Chili and Nut meg is included in this list. . India is the world's largest producer, consumer and exporter of chili peppers. World production of nutmeg is estimated to average between 10,000 and 12,000 tonnes per year.Nut meg medicinally very useful.

1. **Chilies**
2. **Bioactive compounds**
3. **Nut meg**
4. **Myristicin poisoning**
5. **Health benefits**

1:Chilies,

Common pepper: A wide range of intensity is found in commonly used peppers: Bell pepper, New Mexico green Chile, ect

History: early Americans were flavoring their foods with hot chilies. They were one of the first cultivated crops, domesticated by prehistoric peoples from Peru to the Bahamas.

Family: Solanaceae

Genus:Capscin

The first chilies were brought to Spain in 1493 by Diego Álvarez Chanca, a physician on Columbus' second voyage to the West Indies in 1493, brought the first chili peppers to Spain and first wrote about their medicinal effects in 1494. Peppers and bell peppers for human consumption as an important source of nutrient such as carotenoids, phenols, vitamin C, foliates .The nutrient components of peppers are mainly relying on the variety and their stages of maturity. In peppers, there are phytochemical property that have many biochemicals and pharmacological properties which includes antioxidants, anti-inflammatory, antiallergenic and anti-carcinogenic activities. India is the world's largest producer, consumer and exporter of chili peppers. Guntur state of Andhra Pradesh produces 30% of all the chilies produced in India. Andhra Pradesh as a whole contributes 75% of India's chili exports.

2: Bioactive compounds health benefits

Red chilies contain large amounts of Vitamin C and small amounts of carotenoids .Yellow and especially green chilies contain a considerably lower amount of both substances. In addition, peppers are a good source of most B, Vitamin and Vitamin B_6 in particular. They are very high in potassium, magnesium, and iron.

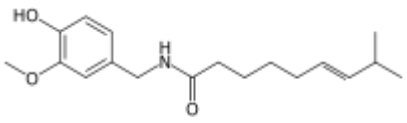
Capsaicin is present in large quantities in the placental tissue (which holds the seeds), the internal membranes and to a lesser extent, the other fleshy parts of the fruits of plants in the genus Capsicum. The seeds themselves do not produce any capsaicin.

Capsaicinoid is phenolic pungent compounds that have been found mostly in *Capsicum* fruits and contribute to 90% of pungency of pepper fruits.

- Capsaicin, the heat stimulating chemical in chili peppers
- Chili grenade, a type of weapon made with chili peppers
- Chili oil, a condiment for adding heat to food

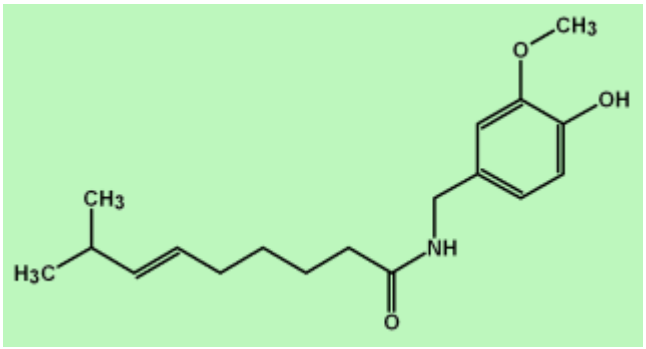
- History of chocolate, which the Mayans drank with ground chili peppers
- Sweet chili sauce, a condiment for adding a sweet, mild heat taste to food
- Taboo food and drink, which in some cultures includes chili peppers

Capsaicin , **8-methyl-*N*-vanillyl-6-nonenamide** is an active component of chilli peppers, which are plants belonging to the genus Capsicum. It is an irritant for mammals, including humans, and produces a sensation of burning in any tissue with which it comes into contact. Capsaicin and several related compounds are called capsaicinoids.



Capsaicin

Capsaicin is the main capsaicinoid in chili peppers, followed by dihydrocapsaicin.. Dilute solutions of pure capsaicinoids produced different types of pungency; however, these differences were not noted using more concentrated solutions.



capsaicinoids

There is also evidence that capsaicin may have evolved as an anti fungal agent: the fungal pathogen *Fusarium.*, which is known to infect wild chilies and thereby reduce

seed viability, is deterred by capsaicin, which thus limits this form of predisposal seed mortality.

Fusarium is a large genus of filamentous fungi, part of a group often referred to as hyphomycetes, widely distributed in soil and associated with plants. Fusarium wilt of banana, popularly known as Panama disease, is a lethal fungal disease caused by the soil-borne fungus *Fusarium* oxysporum . The fungal pathogen *Fusarium oxysporum* affects a wide variety of hosts of any age. Tomato, tobacco, legumes, cucurbits, sweet potatoes and banana are a few of the most susceptible plants, but it will also infect other herbaceous plants.

Each capsaicinoid has a different effect on the mouth, and variation in the proportions of these chemical is responsible for the differing sensations produced by different varieties. Capsaicin causes pain and inflammation if consumed to excess, and can even burn the skin on contact in high concentrations. It is also the primary ingredient in pepper spray. It is common for people to experience pleasurable effects from ingesting capsaicin and capsaicin effective as a topical analgesic.

Pepper spray and pests

Capsaicin is also an active ingredient in riot control and personal defense pepper spray agents. When the spray comes in contact with skin, especially eyes or mucous membranes, it produces pain and breathing difficulty, discouraging assailants.

Capsaicin is also used to deter pests, specifically mammalian pests. Targets of capsaicin repellants include voles, deer, rabbits, squirrels, insects, and attacking dogs. The first pesticide product using solely capsaicin as the active ingredient was registered with the U.S. Department of Agriculture in 1962

Health effects

Capsaicin is a highly irritant material requiring proper protective goggles, respirators, and proper hazardous material-handling procedures. Capsaicin takes effect upon skin

contact, eye contact (irritant), ingestion, and inhalation (lung irritant, lung sensitizer). They cause burning or stinging pain to the skin and, if ingested in large amounts by adults or small amounts by children, can produce nausea, vomiting, abdominal pain, and burning diarrhea.

Chili oil:When using chili oil, the cook or diner may choose how much of the solids to use; sometimes only the oil is used, without any solids. Chili oil is commercially available in glass jars, although it may also be made from scratch at home. It is usually available by request at Chinese restaurants.

Chili sauce: Chili sauce may be hot sweet and may differ from hot sauce in that many sweet or mild varieties exist, which is typically lacking in hot sauces. Several varieties of chili sauce include sugar in their preparation, such as sweet chili sauce and Thai sweet chili sauce, which adds sweetness to their flavor profile.

Folklore:

As well as playing an essential role in South Asian food chilies have entered superstitions and rites, particularly in the south of India. The potency of chilies are firmly believed to have a supernatural element. It is customary to hang a few chilies with a lemon over the threshold of a residence to deter evil. Chiles are also used to ward off the evil eye. A handful of chilies together with other condiments such as curry leaves and a little ash from the hearth is waved over a person's head to create a shield against curses and bad spells.Chiles are the cheapest vegetables available in India and so are eaten across all groups of people.

There are more than 400 different varieties of chilies found all over the world. The world's hottest chili "Naga Jolokia" is cultivated in hilly terrain of Assam in a small town Tezpur, India. Chili became extremely popular in India after it was first brought to India by Vasco-da-Gama. The origin of chilies is believed to be as old as 7000 B.C**.** used in Mexico. Chilies were grown and cultivated from 3500 BC. Mexicans used it to spice up their food. Chili was brought to the rest of the world by Christopher Columbus

who discovered America in 1493. Christopher had set from Spain to reach India to bring spices such as pepper back to his country. Christopher not only mistook America for India, but also mistook chili as the black pepper. That is how the chili got the name **'**chile pepper**.**

Chili found its way in ayurveda, the traditional Indian medical system. According to ayurveda, chili has many medicinal properties such as stimulating good digestion and endorphins, a natural pain killer to relieve pains.

The World's Hottest Chile Peppers: **Naga Jolokia**,: Ghost Pepper, Trinidad Scorpion, Hottest on earth! A little history on the supper hot peppers. It will also be developed into papper spray as a self-defence and antirape product. bhut jolokia-based aerosol sprays could be used as a "safety device", and "civil variants" of chili grenades could be used to control and disperse mobs. In 2007, Guinness world record certified that the ghost pepper was the world's hottest chili pepper.

10, hotest chili paper in the world:

1. Carolina Reaper
2. Trinidad Scorpion Moruga
3. 7 Pot Douglah, also known as the 7 Pod Douglah or Chocolate 7 Pod, is one of the rarest and hottest of the 7 pod strains. Currently the 3rd hottest pepper in the world.
4. 7 Pot Primo
5. Trinidad Scorpion
6. Naga viper: Extremely rare pepper cultivated in the UK. Combination of many different peppers and years of cross pollination created this variety of "Super HOT" pepper.
7. Ghost Pepper (Bhut Jolokia)
8. 7 Pot Barrackpore

9. 7 Pod Red (Giant)
10. Red Savina Habanero

Evoluation of hot taste

Chiles evolved their hot taste as protection from mammalian predators whose digestive tract would destroy the seeds. Their flavor is affected by the genetic ancestry of each plant and by the environmental conditions under which it is grown. The most precise way of measuring a chile's "heat," or pungency, uses High Performance Liquid Chromatography. A less formal test involves diluting a sample until the heat can no longer be tasted. The results are popularly expressed as Scoville. The scale is named after its creator, American pharmacist Wiilbur Scoville. His method, devised in 1912, is known as the Scoville Organoleptic Test

Heat Units. This comparative list is for fresh chilies – dried ones can be much hotter.

Bell Pepper 0
Anaheim 500-1000
Pasilla 1000-1500
Jalapeño 2500-5000
Serrano 5000-15,000
Yellow Wax 5000-15,000
Cayenne 30,000-50,000
Chile Pequin 30,000-50,000
Chipotle (dried) 50,000-100,000
Habanero 100,000-300,000

Medical Applications

Red peppers provide many therapeutic benefits when eaten. They are rich in vitamins A and C, contain carotene, an antioxidant, and have been shown to reduce levels of cholesterol and triglycerides in the blood. Cultures where people eat large amounts of cayenne have much lower rates of cardiovascular disease.

Preservation:

Chilies can dry, freeze, or smoke the chilies to preserve them and break the stalks. This will preserve both green chili and red chili for longer time. Store them in air tight container and keep it away from heat. Chilies can also be preserved by canning them. Green chilies can be preserved and prevented from turning it red by removing the stalk and storing them in dry bags.

3:Nutmeg

Genus: Myristica

Introduction:

Nutmeg is one of the two spices derived from several species of tree in the *genus Myristica.* The most important commercial species is *Myristica Fragristica*, indigenous to the Indonesia. Nutmeg is the seed kernel inside the fruit and mace is the lacy covering (aril) on the kernel. The **prices** of **nutmeg** and mace is always continue to rule high on short supply in the domestic and international markets.

Mace is the vividly red, lacy covering that creeps like ivy round the **n**utmeg stone. The trees can live for 100 years and will yield up to 20,000 nutmegs in a season.

The history of nutmeg is remarkable and illuminating. Nutmeg is known to have been a prized and costly spice in European cuisine as a flavouring, medicinal, and preservative agent. It's said to taste a bit like crystallized ginger.

Uses

Nutmeg is usually used in powdered form. This is the only tropical fruit that is the source of two different spices, obtained from different parts of the plant. Several other

commercial products are also produced from the trees, including essential oils, extracted oleoresens and nutmeg butter.

It is semisolid, reddish-brown in colour, and tastes and smells of nutmeg. About 75% (by weight) of nutmeg butter is trimyristin which can be turned into myristic acid. Which can be used as a replacement for coco butter, can be mixed with other fats like palm oil and has applications as an industrial lubricant.

A **lubricant** is a substance introduced to reduce friction between surfaces in mutual contact, which ultimately reduces the heat generated when the surfaces move. It may also have the function of transmitting forces, transporting foreign particles, or heating or cooling the surfaces. In addition to industrial applications, lubricants are used for many other purposes.

World production:

World production of nutmeg is estimated to average between 10,000 and 12,000 tonnes per year, with annual world demand estimated at 9,000 tonnes; production of mace is estimated at 1,500 to 2,000 tonnes. Indonesia and Grenada dominate production and exports of both products, with world market shares of 75% and 20%, respectively. Other producers include India and Malaysia ,ect.The principal import markets are the European Community, the United States, Japan, and India. Singapore and the Netherlands are major re-exporters.

4:Myristicin poisoning

Nutmeg has been used in medicine since at least the seventh century. In the 19th century, it was used as an abortifacient, which led to numerous recorded cases of nutmeg poisoning.

In its freshly ground form (from whole nutmegs), nutmeg contains myristicin, a monoamine oxidase inhibitor and psychoactive substance.

Myristicin poisoning can induce convulsions, palpitations, , nausea, eventual dehydration and generalized body pain. It is also reputed to be a strong deliriant.

Deliriants are a class of hallucinogen that are unique in that, even with lower doses, they offer solid hallucinations which display themselves seamlessly into waking consciousness, similar to fully formed dreams or delusions. For these reasons, nutmeg has been banned in Saudi Arabia.

Intoxications with nutmeg had effects that varied from person to person, but were often reported to be an excited and confused state with headaches, nausea, dizziness, dry mouth, bloodshot eyes, and memory disturbances. Nutmeg was also reported to induce hallucinogenic effects, such as visual distortions and paranoid ideation. Intoxication took several hours before the maximum effect was reached.

Myristicin poisoning is potentially deadly to some pets and livestock, and may be caused by culinary quantities of nutmeg harmless to humans. For this reason it is recommended not to feed dogs.

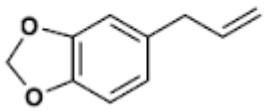
Processing

Nutmeg tree yields up to three times in a season. Just underneath the tough husk is the golden-brown color aril, known as "mace," which firmly enveloping around the nutmeg kernel. Mace is gently peeled-off from its kernel surface, flattened into strips, dried, and sold either as whole (blades) or finely ground powder.

5: Health benefits: Nutmeg and mace contains many plant-derived chemical compounds that are known to have been anti-oxidant, disease preventing, and health promoting properties.

- The spicy nut contains fixed oil trimyristin and many essential volatile oils such as which gives a sweet aromatic flavor to nutmeg such as myristicin, elemicin,

eugenol and safrole. .(Safrole is a phenylpropene. It is a colorless or slightly yellow oily liquid typically extracted from the root-bark or the fruit of sassafras plants in the form of sassafras oil. It has a characteristic "sweet-shop" aroma. Safrole is still regarded by FDA to be a weak carcinogen in rats).The other volatile-oils are pinene, camphene, dipentene, cineole, linalool, sabinene, safrole, terpeniol



Safrole

Terpineol is a naturally occurring monoterpene alcohol that has been isolated from a variety of sources such as cajuput oil, pine oil, and petitgrain oil. Terpineol has a pleasant odor similar to lilac and is a common ingredient in perfumes, cosmetics, and flavors. α-Terpineol is one of the two most abundant aroma constituents of lapsang souchong tea; the α-terpineol originates in the pine smoke used to dry the tea

- The active principles in nutmeg have many therapeutic applications in many traditional medicines as anti-fungal, anti-depressant, aphrodisiac, digestive, and carminative functions.
- This spice is a good source of minerals like copper, potassium, calcium, manganese, iron, zinc and magnesium. Potassium is an important component of cell and body fluids that helps control heart rate and blood pressure. Manganese and copper are used by the body as co-factors for the antioxidant enzyme, superoxide dismutase. Iron is essential for red blood cell production and as a co-factor for cytochrome oxidases enzymes.

- It is also rich in many vital B-complex vitamins, including vitamin C, folic acid, riboflavin, niacin, vitamin A and many flavonoid **anti-oxidants** like beta-carotene and cryptoxanthin that are essential for optimum health.
- Nutmeg oil contains eugenol it is a phenylpropene, an allyl chain-substituted guaiacol. Eugenol is a member of the phenylpropanoids class of chemical compounds. It is present in concentrations of 80–90% in clove bud oil and at 82–88% in clove leaf oil. It is used in perfumeries, flavorings, essential oils and in medicine as a local antiseptic and anaesthetic. It is also used in some mousetraps. and kills certain human colon cancer cell lines in vitro and in vivo. Eugenol may have potential therapeutic effects against diseases characterized by excessive osteoclast activity
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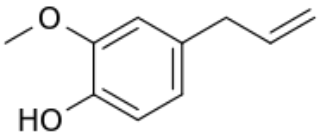

Eugenol

Medicinal uses

- Since ancient times, nutmeg and its oil were being used in Chinese and Indian traditional medicines for illnesses related to the nervous and digestive systems. The compounds in this spice such as *myristicin* and *elemicin* have been soothing as well as stimulant properties on brain.
- Nutmeg oil contains *eugenol*, which has been used in dentistry for toothache relief.
- The oil is also used as a local massage to reduce muscular pain and rheumatic pain of joints.

- Freshly prepared decoction with honey has been used to relief of nausea, gastritis, and indigestion ailments.
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:Conclusion:

Pleasantly aromatic, nutmeg is actually seed kernel of fruit-nutmeg. It is one of the highly prized spices known since antiquity for its aromatic, aphrodisiac, and curative properties. Nutmegs are evergreen trees, native to the rain forest Indonesian Moluccas Island; also known as the *Spice Islands*. Botanically, the plant belongs to *Myristicaceae* family of medium to large trees. Its scientific name is: *Myristica fragrans*

India is the world's largest producer, consumer and exporter of chili peppers. Andhra Pradesh as a whole contributes 75% of India's chili exports. Capsaicin and several related compounds are called capsaicinoids and are produced as secondry metaboilites. Plant secondary metabolism produces products that aid in the growth and development of plants but are not required for the plant to survive. Secondary metabolism facilitates the primary metabolism in plants. Dilute solutions of pure capsaicinoids produced different types of pungency; however, these differences were not noted using more concentrated solutions.