Elettaria *cardamomum*-Medicinal Significance

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***Abstract*- Humans are dependent on food for their survival. Humans used to eat raw food directly from nature without being cooked or processed. Elettaria cardamomum is a spice which is used all over the world. There are many natural flavouring compounds used to flavour food, one such food-flavouring plant include cardamom (Elettaria cardamomum The plant is used for its flavouring and medicinal properties. It consists of many compounds e.g. α-terpinyl acetate and 1,8 cineole. In cardamom Seed, essential oil contains myrcene,α-terpineol, limonene, ß-phellandrene, menthone, sabinene,1,8-cineol, and heptane. Essential oils are obtained from the seeds of cardamom. Extraction of essential oil is done by the steam distillation process.**

The plant is also used in digestive problems by increasing the amount of digestive enzymes in the body. Cardamom is beneficial for maintaining blood sugar levels by increasing insulin sensitivity. It is also used in dairy and milk products, bakery products, pickles, candies and frozen desserts.

***Key point*: *Elettaria cardamomum,* α-terpineol, volatile oil, Steam Distillation.**

INTRODUCTION:

Humans are dependent on food for their survival. The humans used to eat raw food directly from nature without been cooked or processed. During the civilization the humans learned to cooked the food and impart different flavour in the food. The flavoured food is easily ingested and also digested. There are many natural flavouring compounds used to flavour food, one such food flavouring plant include *cardamomum (Elettaria cardamomum)* Cardamom is a spice used for cooking and traditional medicines mostly used all over the world. Its botanical name is *Elettaria cardamomum*. It belongs to family Zingiberaceae. It is one of the oldest known spices of the world. Romans and Greeks used cardamom for aromatic oils and perfumes because of its aroma. Cardamom was discovered by Vikings. *Cardamom* is originated from wild plants and found in Western Ghats in Southern India so this region is also known as Cardamom Hills. *Elettaria cardamomum* is native to India, Bhutan, and Nepal, and currently it is cultivated in all parts of the world, including Sri Lanka, Tanzania and Guatemala.

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REVIEW OF LITERATURE:

Dini M.in the year 2017worked on Peptic ulcer disease and non-steroidal anti-inflammatory drugs. Gustavo R. Cárdenas Garza et.al in 2021 determined the benefits of cardamom (*Elettaria cardamomum* (L.) Maton) and Turmeric (*Curcuma longa* L.) Extracts for their applications as Natural Anti-Inflammatory Adjuvants. Kishorbhai D. et.al in the year 2018 analysed the Chemistry, Medicinal Properties, and applications of cardamom in Dairy and Food Industry. Ebru Kuyumcu et.al in 2013 determined the Essential Oil Composition of *Elettaria cardamomum*. Biju Mani, Et.al in 2017 carried out the analysis of constituents in different Fractions collected during distillation of Cardamom oil for flavour and fragrance applications

MATERIALS AND METHODS:

For the current review the plant which is selected is *Elettaria cardamomum.* (Cardamom). *Elettaria cardamomum* is sowed during the monsoon season in India from June to August. Cardamom grows well in high humid climates with an average temperature of 18-35°C. Propagation of Cardamom occurs through suckers. In dry season, the plant needs regular irrigation. In Cardamom, fruits appear after two years of plantation. The pods are harvested after maturity when they turn yellow or light green in colour.

Fig 1(a) *Elettaria cardamomum seeds*

(b) Elettaria cardamomum plant body

Cardamom is used in coffee, tea and desert flavour because of its sweet and spicy flavour and aroma. *Cardamom* is used as traditional and Ayurvedic medicine all over the world. Cardamom is used to cure several diseases like digestive problems, respiratory issues, and infections. It relieves cold and cough due to a compound which have anti-inflammatory, antispasmodic, and expectorant properties is sowed during the monsoon season in India from June to August. Cardamom grows well in high humid climates with an average temperature of 18-35°C. Propagation of Cardamom occurs through suckers. In dry season, the plant needs regular irrigation. In Cardamom, fruits appear after two years of plantation. The pods are harvested after maturity when they turn yellow or light green in colour.

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Steam distillation is a method used to separate volatile compounds that have higher boiling point. in this process steam is used as a separation and energy agent. Cardamom seeds are crushed and placed on perforated stainless steel sheet. Steam is introduced into this setup by passing from the bottom. The essential oil can be extracted along with condensed vapours on water.

Fig 2 Soxhlet Apparatus for steam distillation

RESULT AND DISCUSSION:

Cardamom was used to alleviate-digestive disorders obesity in ancient era. Nowadays cardamom is used in depression, bronchitis, dysentery, Influenza and infections. Cardamom also effects on blood, glucose and lipid regulation inflammation and Hypertension and gastrointestinal discomfort of pregnancy . Seeds of cardamom are frequently used as flavouring agent in food. It is also used for making volatile oil. The presence of carotenoids, phenolics compound, alkaloids, nitrogen and organosulfur compounds influence the immune system of the humans.

Cardamom may be helpful to the people with high blood pressure due to its antioxidant and diuretic properties. Cardamom is often use to treat bad breath and is used in chew-gums because of its ability to kill common mouth bacteria. The essential oil and extracts of cardamom may be effective against variety of bacterial strains and fungal infection and food poisoning in humans.

Medicinal properties of cardamom are its anti-inflammatory property, antimicrobial property, antispasmodic, diuretic, carminative, antiseptic and digestive. (Gustavo R. Cárdenas Garza) Cardamom also used in Ayurvedic medicine of heart disease, urinary disease, food poisoning, cold, bladder and constipation. Seeds of cardamom used in sweet, coming, aromatic, diuretic and tonic.

Other benefits of cardamom are anticancer activity, antiulcerogenic activity, antimicrobial, skin penetration, enhancing activity, gastroprotective activity, blood pressure lowering activity, cigarette de addiction, oral health, digestive and stomachic and stimulants. it is also used as insect repellent and perfumes (Kishorbhai D. Jadav, Bhavbhuti M. Mehta).

CHEMICAL COMPOSITION OF CARDAMOM

The seed mainly consists of, fatty oil, steam-volatile oil, pigments, calcium oxalate, starch, cellulose, protein, sugars, silica, and minerals.

Starch is the major constituent of the seed and another most important constituent of fruit husk it is crude fibre. The amount of volatile oil in cardamom seeds varies from 6.5–1.8% for the types of two cardamom grown in Malabar Mysore in India. The amount of volatile oil in immature capsules is low which from 4 to 5%. Flavour and aroma of cardamom are extracted from essential oil which mainly composed of α-terpinyl acetate(20–55%) and 1,8 cineole (20-60%).In cardamom Seed essential oil contains myrcene 27%, α-terpineol 45%, limonene 8%, ß-phellandrene 3%, menthone 6%, sabinene 2%,1,8-cineol 2%, and heptane 2% (Biju Mani, Vinuthaa Murthy , Kwang Choon Yee).

In cardamom minor component of essential oil include 1,4-cineole, limonene, myrcene, sabinene, linalool, linalyl acetate, borneol, α-pinene, α-terpineol, camphene and others. Composition and content of volatile oil is the main factor which determines the quality of cardamom (Ebru Kuyumchu savan F, Zehra Kuchubay). Seeds of cardamom is rich in thiamine, niacin, vitamin B6, vitamin C, zinc, copper, riboflavin, iron, manganese, potassium, phosphorus. The chemical composition of cardamom varies with variety, region and age of the product. The storage conditions is responsible for the content of volatile oil in cardamom seed, but dominate the mono and hydrocarbon of volatile oil. Ammomum species of cardamom are rich in all 1,8-cineole and some large amounts of camphor and borneol. Table 1 shows the different constituents in the seeds of Elettaria *cardamomum.*

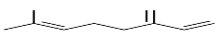
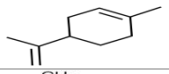
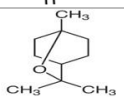
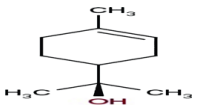
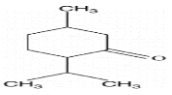
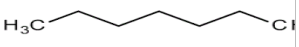
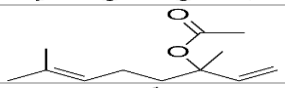
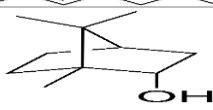
Major Constituents in the seeds of Elettaria *cardamomum*		
Constituents	**FORMULA**	**STRUCTURE**
Myrcene	$C_{10}H_{16}$	
Limonene	$C_{10}H_{16}$	
1,8-Cineol	$C_{10}H_{18}O$	
Alpha-Terpineol	$C_{10}H_{18}O$	
Menthone	$C_{10}H_{18}O$	
beta-Phellandrene	C10H16	
Heptane	C_7H_{16}	
Minor Constituents in the seeds of Elettaria *cardamomum*		
MINOR COMPONENT	FORMULA	STRUCTURE
Alpha-pinene	C10H16	
Alpha-sabinene	C10H16	
Linalool	C10H18O	
Linalyl acetate	C12H20O2	
Borneol	C10H18O	

Table 1 Constituents in the seeds of Elettaria *cardamomum.*

Compounds	**Concentration of compounds in percentage**
α-terpineol	45
α-terpinyl acetate	31.3
myrcene	27

limonene	8
menthone	6
ß-phellandrene	3
sabinene	2.8
heptane	2
1,8-cineol	2
1,8 cineole	2

Table 2 : Percentage of compounds in Elettaria *cardamomum*

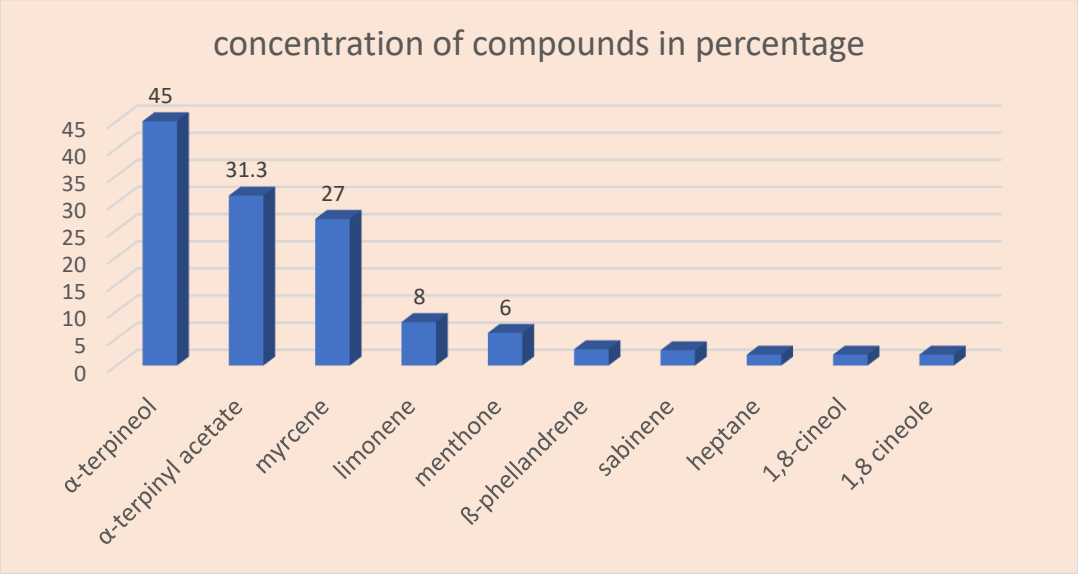


Fig 2 : Graphical representation of concentrations of compounds in Elettaria *cardamomum*.

CONCLUSION:

It is concluded from the current study that cardamom is used as spices and has many medicinal properties. The plant has volatile oils which is responsible for aroma and flavour. Some of the components present in cardamom include α-terpinyl acetate(20–55%) and 1,8 cineole (20-60%).In cardamom Seed essential oil contains myrcene 27%, α-terpineol 45%, limonene 8%, ß-phellandrene 3%, menthone 6%, sabinene 2%,1,8-cineol 2%, ,heptane 2% (Biju Mani, Vinuthaa Murthy , Kwang Choon Yee). Some of the compounds found in plant include sugar, starch, proteins and fatty acids. The plant is used in food and dairy industry. It is used to flavour milk products, sweets, prickles, frozen deserts etc. Apart of its use in food it is also used as insect repellent and perfumes. Cardamom is known for its various therapeutic properties such as digestive, diuretic, carminatives, antiseptic stimulants and anti-inflammatory. If we use cardamon in diet increases overall health(Gustavo R. Cárdenas Garza).

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