



CINNAMON: THE MAGIC HERB.

¹*Rani Deepak Navale, ²Abhishek Jadhav, ³Prathamesh Pagar, ⁴Dhanashri Bachhav

^{1,2,3}Students, ⁴Teacher

K.V.N.N

Institute of Pharmaceutical Education and Research, Nashik.

Abstract: The cinnamon is widely used as Flavors additive which help in improving odor, taste of color of meal for a long time. Cinnamon that derivative form a Latin word related to sweet wood. Cinnamon is one medicinal universal plant which has been used daily by people all over the world. The different part of a plant & which is used in treatment of various disease conditions. The cinnamon is most widely used as an anti-oxidant in food The cinnamon shown to be beneficial for glucose uptake insulin regulation. The herbs have been used as derivation of potent anticancer agent. The cinnamon is also showing an anti-Fungal activity. The cinnamon in also used in treatment of heart disease, also used as Immunity booster. As a result, Current studies focus on the therapeutic activity of cinnamon.

Keywords: Cinnamomum Zeylanicum, Dalchini, Cinnamaldehyde.

INTRODUCTION

Flora is referred to as a part of "Nature's pharmacy" though their action will be the same as fashionable medicine in some ways, seasoner remedies are typically gentler and safer several of the medicine utilized in typical medication are derived from flora. Flora are plants truly mature recent or purchased in dried type. They embrace the equatorial aromatics, like pepper, cinnamon and cloves etc. There are four main styles of cinnamon, laurel (Cinnamomum zeylanicum), and Cassia cinnamon (Cinnamomum cassia) are the foremost well-liked. laurel is typically referred to as "true cinnamon".[01] Cinnamon, that by-product from a Latin word associated with sweet wood, non-inheritable this name from the inner bark that take into account the most a part of evergreen Dalchini trees. Belongs to (Lauraceae) family of kingdom. Cinnamon classified as 2 main varieties.[02] Dalchini is one amongst the foremost well-liked and oldest spices utilized in ancient Chinese medication.[03] Cinnamon should be dried before its hold on and sold In market.[04] Cinnamon contains metal, iron, dietary fibre, and Ca. it's derivatives, like cinnamaldehyde (CNAD), cinnamic acid, cinnamate, and plenty of different ingredients, like polyphenols and antioxidants, with medicine, medication, antimicrobial, and malignant tumor properties.[05] The bark of cinnamon has been used as a spice Associate in to form tea and conjointly as an seasoner remedy for the treatment of common colds, vessel diseases, and chronic GI (Gastrointestinal) and medical specialty disorders in oriental seasoner medication. Dalchini has likewise been used for treating sore throats, cough, stomach upset, abdominal cramps.[06] Essential oils and synthetic resin compounds in cinnamon contribute completely to human health. Studies have recently shown the positive Terms this influence of cinnamon within the treatment of Alzheimer's disease, diabetes, arthritis, and coronary-artery disease. Essential oils in cinnamon, like trans-cinnamaldehyde, cinnamyl acetate, eugenol, L-borneol, caryophyllene compound, β -caryophyllene, L-bornyl acetate, E-nerolidol, α -cubebene, α -terpineol, terpinolene, and α -thujene.[05] Classical uses of Cinnamon throughout Asia, Africa, and Europe are recorded, wherever it's been used as a medication for symptom, nausea and chill, or as a spice for seasoning meats.[07]

LOCAL NAMES OF CINNAMON:

Hindi (Dalchini)	Malayalam (krugapatta)	Tamil (pattai)
Indonesian (Kayu manis)	Persian (darchin)	Sinhala (kurundu)

Fig No 1: Local names of Cinnamon.[08]

HISTORY

Use of cinnamon can be dated back to almost 2800 BC where it was initially referred to as "Kwai" in Chinese language. It was used in Egypt for embalming of mummies as well as for its fragrance and flavoring properties. The native of true cinnamon or Ceylon cinnamon was then found to be in Sri Lanka (also known as Ceylon). Cinnamon is exported as cinnamon quills from four main countries: Indonesia, China, Vietnam and Sri Lanka.[09] Trees belonging to the genus *Cinnamomum* are one of the major materials used in traditional Chinese medicine. Cinnamon has been widely used in China and Japan for the treatment of fever and inflammation as well as for improvement of an appetite depressed by influenza.[07]

TAXONOMY OF CINNAMON:

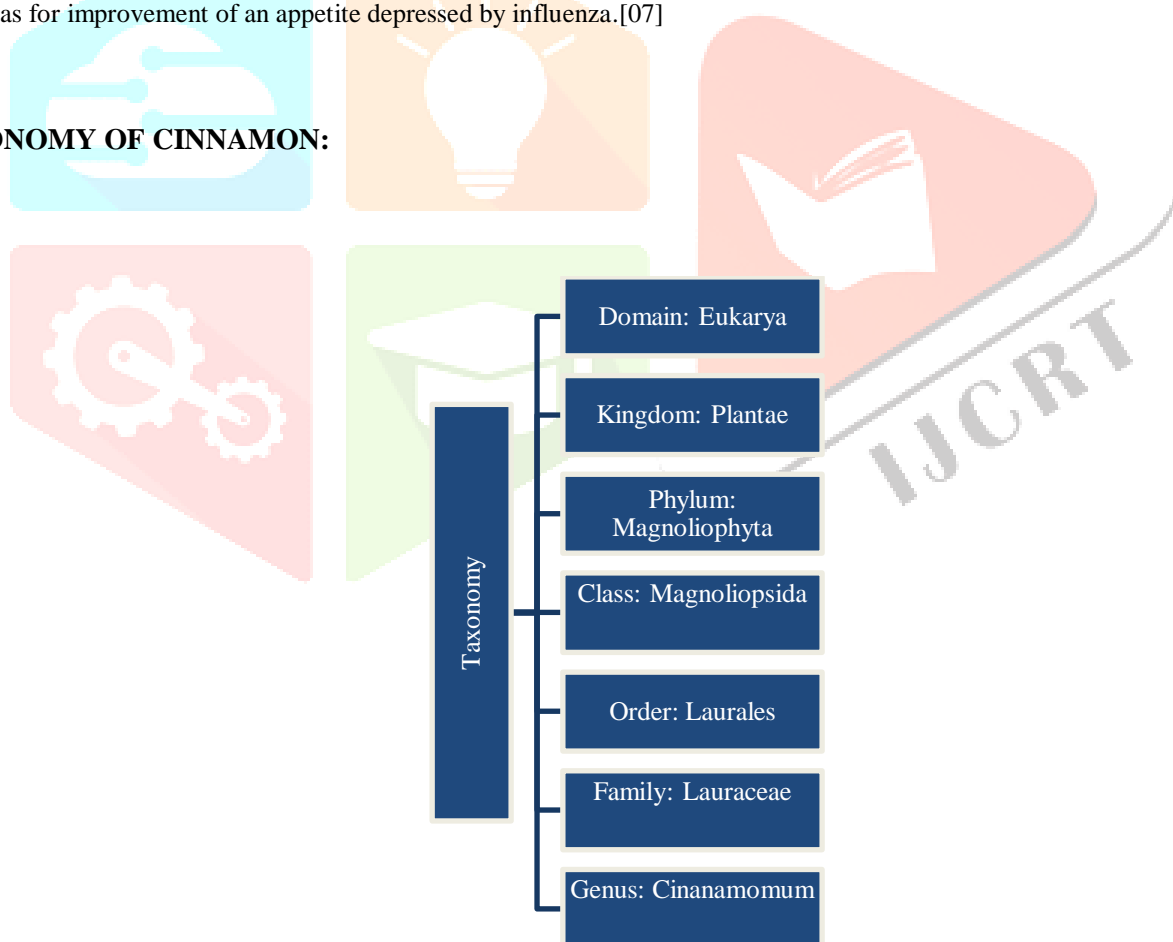


Fig No 2: Taxonomy of Cinnamon.[10]

BOTANICAL ILLUSTRATIONS: [01]**Seeds:**

These Cinnamon trees are mainly generated by seeds.



Fig No 3: Seeds of Cinnamon.[13]

Bark:

It is a golden red bark and thick up to 1500 meters that's dried and that is the cinnamon spice. tiny or medium sized tree typically up to 6.096- 12.192 meters.



Fig No 4: bark of Cinnamon.[14]

Leaves:

These are rectangular - elliptic, ovate shapes dark shiny inexperienced and with a 3 outstanding nerves from the bottom. Leather like and roughly 7-20 cm long.



Fig No 5: Leaves of Cinnamon.[15]

Flowers:

These are tiny in lax, yellow in color, inconspicuous, paniculate.



Fig No 6: Flower of Cinnamon.[16]

Fruit:

Fruits are black, pulpy, aromatic, elliptical, drupes with single seed.



Fig No 7: Fruit of Cinnamon.[17]

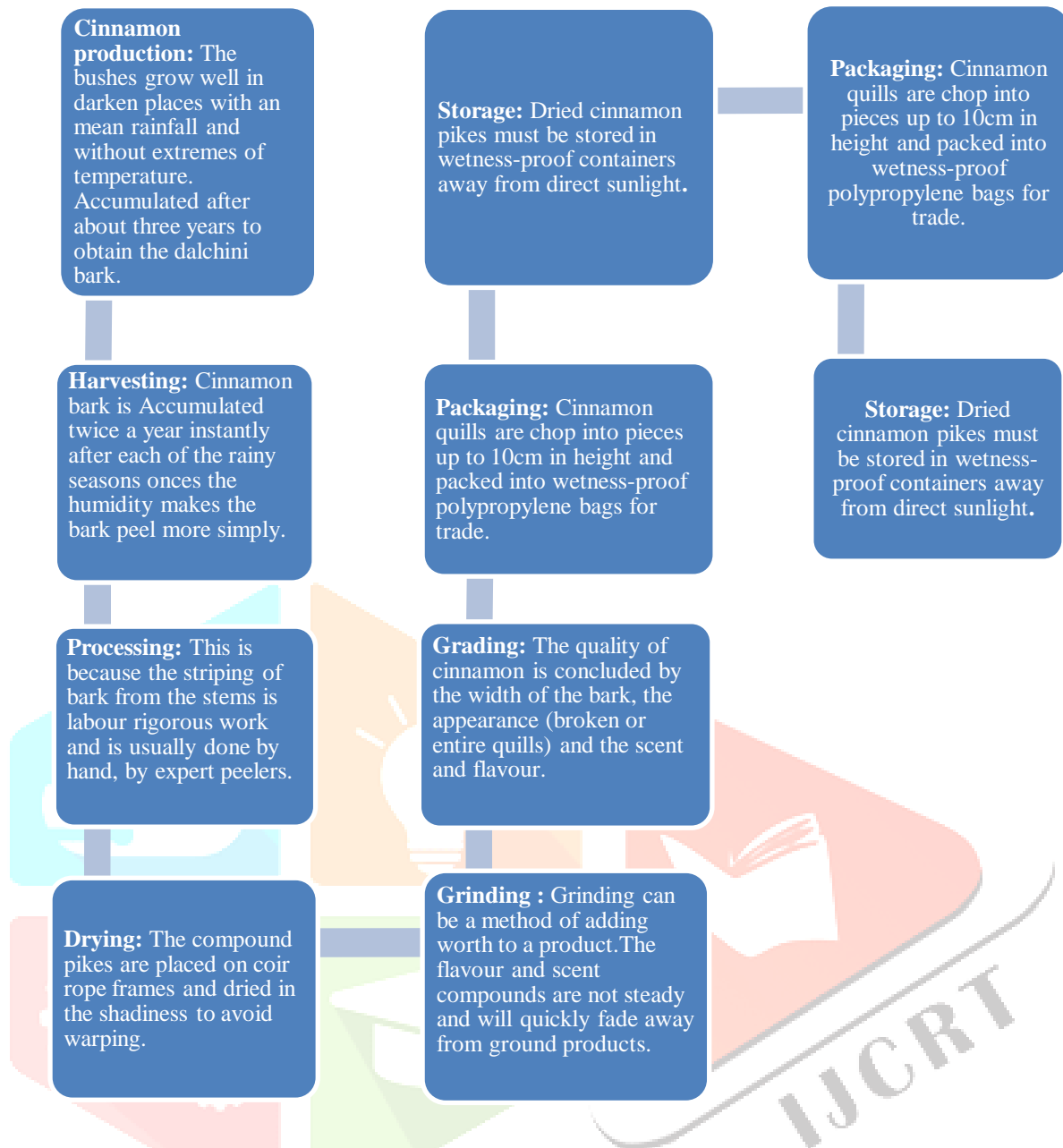
CULTIVATION PROCESSING:

Fig No 8: Cultivation processing of cinnamon.[04]

Physical and Chemical Properties of Cinnamon Oil:**Table 1:** Physical and Chemical Properties of Cinnamon Oil.[11]

Property	Characteristic/Value	Source
Molecular Formula:	C ₉ H ₈ O (Cinnamaldehyde)	(Merck 2015)
Molecular Weight:	132.159 (Cinnamaldehyde)	(Merck 2015)
Percent Composition	Cinnamon bark oil: Cinnamaldehyde (75- 90%); linalool, eugenol, cinnamyl acetate; cinnamic acid; cinnamon alcohol; various other terpenoids	(Khan and Abourashed 2010)
Physical State at 25°C/1 Atm.	Liquid (oil) Solid (powder)	(Merck 2015)
Color	Yellow/amber/dark brown/clear	(Merck 2015; Royal Society of Chem- istry 2014)
Odor	Distinct cinnamon spice aroma (cinnamon bark oil); cinnamon-clove odor (cinnamon leaf oil)	(Burdock 2010; Merck 2015)
Density/Specific Gravity	1.010-1.030	(Merck 2015)
Melting Point	-7.5°C (Cinnamaldehyde)	(Royal Society of Chemistry 2014)
Boiling Point	253°C (Cinnamaldehyde)	(Royal Society of Chemistry 2014)

Solubility	Soluble at 10% in ethyl alcohol 96%; soluble in most vegetable oils and glacial acetic acid. Soluble in propylene glycol. Slightly soluble in water. Insoluble in glycerin, mineral oil.	(Food Chemicals Codex Committee 2011; Merck 2015; Royal Society of Chemistry 2014)
Vapor Pressure	0.13 hPa	(Royal Society of Chemistry 2014)
Acid Value	NA (varies)	
Octanol/Water (K_{ow}) Coefficient	1.90 (Cinnamaldehyde)	(US NLM 2014)
Viscosity	Poise: 0.041, \pm 0.001	(Siddiqui and Ahmad 2013)
Miscibility	Miscible in chloroform, ether, oils and alcohols; not miscible in water	(US NLM 2014; Mericks 2015)
Flammability	Flash, point: 88°C open cup	(US NLM 2014)
Storage Stability	Stable. Combustible. Incompatible with strong oxidizing agents, strong bases.	(US NLM 2014)
Corrosion Characteristics	Cinnamon plant extracts act as a corrosion inhibitor in steel.	(Fouda et al. 2014)
Air half life	5.13 hr. (Cinnamaldehyde)	(Royal Society of Chemistry 2014)
Soil half life	720 hrs. (Cinnamaldehyde)	(Royal Society of Chemistry 2014)
Water half life	360 hrs. (Cinnamaldehyde)	(Royal Society of Chemistry 2014)
Persistence	Not found	

Extraction Method of Cinnamon Oil:

The oil is removed from the branch of the Dalchini tree by using steam distillation method. The major active constituents of dalchini oil removed from the branch are eugenol, cinnamaldehyde, and linalool. These three make up over 82.5 % of the composition of the oil. The principal ingredient of dalchini oil depends upon which part of the plant the oil comes from cinnamaldehyde (bark), eugenol (leaf), or camphor (root).[20]

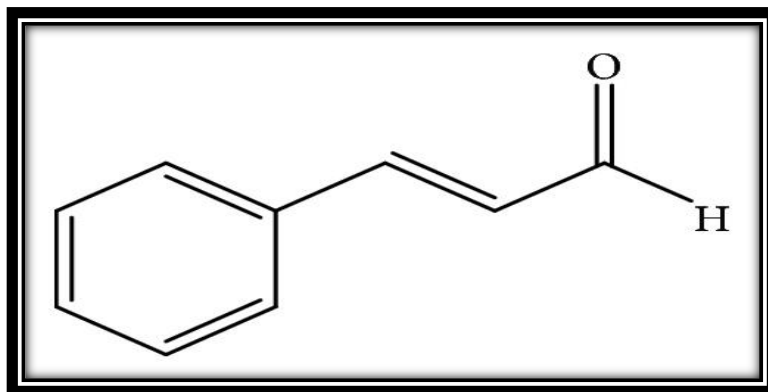
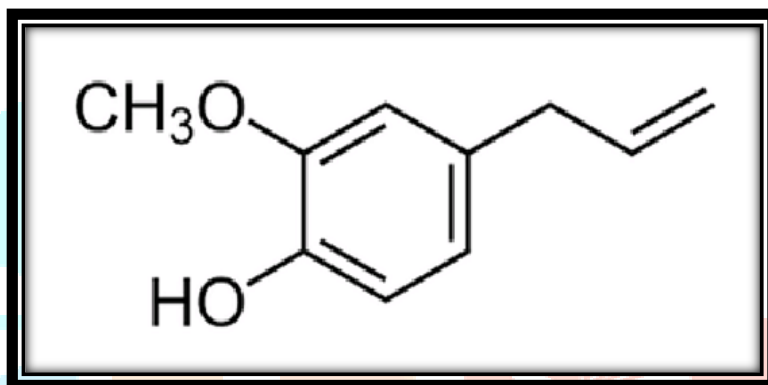
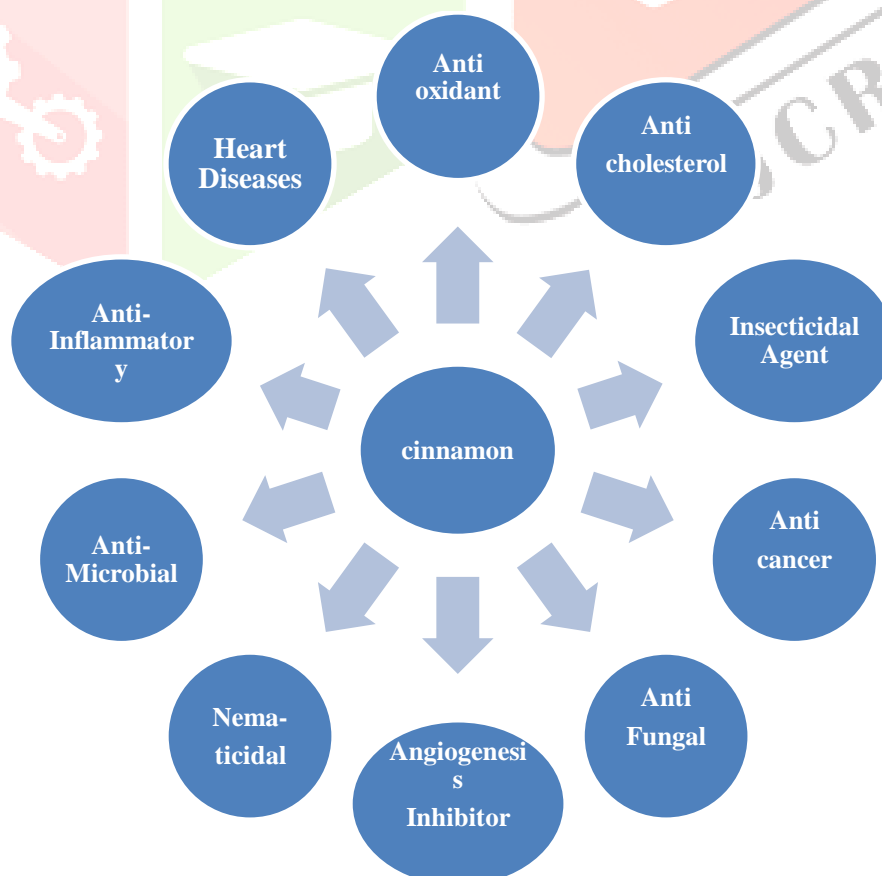
PHYTO – CHEMISTRY:

Cinnamon is identified for its aromatic fragrance and sweet, warm taste. Mostly cinnamon is employed as a spice, cinnamon has nice medicative standards. It contains variety of compounds, as well as essential oils that give the spice's flavor. Other compounds that are available in lesser percentages which are Cinnamic acid, hydroxyl group Cinnamaldehyde, Cinnamyl alcohol, Coumarin, Cinnamyl acetate, Borneol etc. [01] Cinnamon may be a wealthy supply of significant oils in addition as different derivatives as well as cinnamic acid, cinnamaldehyde, and cinnamate. numerous chemicals constitute like cinnamaldehyde, cinnamyl acetate, α -thujene.[12]

CHEMICAL CONSTITUENTS:

Table 2: chemical constituents of cinnamon.[10]

Sr.No	Chemical constituents	Plant part	Percentage
1	Cinnamaldehyde	Leaves and barks	1 to 5%, 65 to 80%
2	Eugenol	Leaves and barks	70 to 95%, 5 to 10%
3	Camphor	Root barks	60%
4	Trans-cinnamyl acetate	Fruits	42 to 54%
5	Caryophyllene	Fruits	9 to 14%
6	Terpene hydrocarbon	Flower bud	78%
7	α -Bergamotene	Flower bud	27.38%
8	α -copaene	Flower bud	23.05%
9	Oxygenated terpenoid	Flower bud	9%
10	(E)- cinnamyl acetate	Flower	41.98%
11	trans- α -Bergamotene	Flower	7.97%
12	Caryophyllene oxide	Flower	7.20%

STRUCTURE OF CINNAMON AND IT'S COMPOUNDS:**Cinnamaldehyde****Fig No 9:** Structure of Cinnamaldehyde.[18]**Eugenol****Fig No 10:** Structure of Eugenol.[19]**PHARMACOLOGICAL ACTIVITIES OF CINNAMON:****Fig No 11:** Activity of Cinnamon. [06,09]

1]Anti-oxidant

Particular antioxidant Phyto-chemicals that have been recognized in cinnamon include epicatechin, camphene, eugenol, gamma-terpinene, phenol, salicylic acid, and tannins.[06] Cinnamon barks from *C zeylanicum*, *C. cassia* or other cinnamon species are reported to exhibit antioxidant and free radical-scavenging activities.[07]

2]Anti-cholesterol

Cinnamon (*ròu guì*) have shown to be beneficial for glucose uptake, insulin regulation, and blood lipid profile.[06] Cinnamon may significantly lower LDL (Low Density Lipo Protein) or "bad" cholesterol and triglycerides and total cholesterol.[01] This anti-oxidant effect has been recently extended to its application in liver disorders.[9]

3]Insecticidal Agent

There is an urgent need for the development of effective insecticide that create no harm to the environment and non-target organisms. The essential oil of Cinnamon was investigated for their insecticidal activity against nymphs and adults of planthopper *Metcalfa pruinosa*. Leaf-dipping bioassay method was used for the evaluation of the toxicity of the Cinnamon oil constituents against the nymph of *M. pruinosa*. Insecticidal activity of the essential oil of *Cinnamomum camphora* leaves was investigated against *Lasioderma serricorne*. [10]

4]Anti-cancer

Herbs have been used as a derivation of potent anticancer agents. And 60% of currently used anticancer drugs are derived from natural sources such as plants, marine organisms, and microorganisms.[06] Cinnamon reduced the proliferation of leukaemia and lymphoma cancer cells. Due to the presence of calcium and fibre in cinnamon which can help to remove bile, which prevents damage to colon cells, thus prevents colon cancer.[01] The Cinnamon extract offers the development of complementary and alternative medicines for curing the illness of diverse cancers. It contains the antineoplastic potential in the treatment of cancer. The anticancer activity of Cinnamon inhibits the proliferation of several human cancer cell line including leukemia, ovarian, breast and lung tumor cells.[10]

5]Anti-Fungal

The antibacterial activity of cinnamon oil has been demonstrated, and it has been shown that cinnamon oil alone or in combination with triclosan. Cinnamaldehyde is one of the main components of cinnamon oil. Cinnamaldehyde has been shown to destroy the cytoplasmic membrane of both Gram-positive and Gram-negative bacteria. The major compound in leaf is essential oils, which have the vigorous antifungal activities in contrast with the other components. [06] Due to its antifungal, antibacterial, antiviral, antiparasitic and antiseptic properties, it is effective in fighting vaginal yeast infections, oral yeast infections and stomach ulcers and head lice.[01]

6]Angiogenesis Inhibitor

Angiogenesis is the evolution of new blood vessels in a process used by tumors to encourage growth and metastasis. VEGF is one of the most critical and specific angiogenesis factors. One study has shown that Cinnamon is a natural diet derived source of anti-VEGF agents. It was found that cinnamon and its components effectively inhibited the activity of VEGFR2 kinase as well as VEGF signaling in endothelial cells. [06] Cinnamon boosts the activity of and hence acts as a brain tonic. It helps in removing nervous tension and memory loss.[01]

7]Nematicidal

cinnamaldehyde is the most harmful compound against adult *B. xylophilus*, followed by (E)-2 methoxy cinnamaldehyde and (E)-cinnamic acid.[06]

8]Anti-Microbial

The cinnamaldehyde component of cinnamon is responsible for its anti-microbial activity.[9] Cinnamon is very useful home remedy for common or severe colds. It will cure most chronic cough, cold and clear the sinuses.[01] Two important bioactive phytochemical such as cinnamaldehyde and eugenol were responsible for the antibacterial property of Cinnamon. The wide use of *Cinnamomum* in food products and cosmetics are to avoid the bacterial degradation and reduces the chance of infection. The antibacterial activity of *C. cassia* essential oil and in combination with some antibiotic against three multi drug-resistant bacteria viz. *E. coli*, *S aureus* and *P. aeruginosa* were investigated. The antimicrobial activity of *C. zeylanicum* essential oil against *Paenibacillus* larvae was investigated.[10]

9]Anti-Inflammatory

Cinnamon water extract possesses anti-inflammatory effect in vitro ascribed to fall in levels of tumor necrosis factor α and Interleukin 6.[9] The essential oil of Cinnamon has been known in Ayurvedic medicine for the treatment of aching joints and numb pain. The Cinnamon essential oil was reported for their activity towards chronic inflammation and fibrosis. The anti-inflammatory activity of two species of Cinnamon i.e., Cinnamomum zeylanicum and C. cassia were reported. The cinnamon and its component can be used in the treatment of amelioration of age-related inflammatory condition (Gunawardena et al., 2015). The extract from the bark of Cinnamomum verum are known for their anti-inflammatory effect from thousands of years.[10]

10]Heart diseases

Cinnamaldehyde and cinnamic acid are said to be cardio protective due to their ability to produce nitric oxide as well as the associated anti-inflammatory property. Its vasorelaxation effect has also been attributed the cinnamaldehyde component which impede the L type calcium channels.[10] The calcium and fibre which are present in cinnamon provides protection against heart diseases. Cinnamon in the food helps those suffering from coronary artery disease and high blood pressure.[01]

11]Cinnamon as Immunity Booster

Dalchini is an important herb in Indian traditional system that act as immunity booster and keep many diseases away. Ayurveda said that Dalchini and honey can treat almost any problem and no side effect such as various skin related problem, in the treatment of arthritis pain, destroy bladder germs, treat gums and teeth infection, to regulate cholesterol and help in weight loss and also prevent fat accumulation in the body. Cinnamon is of the major component which help to increase our immunity as well as to cure of many diseases.[10]

CINNAMON OIL

Cinnamon is primarily cultivated for the aromatic bark widely used in cooking and in traditional medicine. It is possible to produce cinnamon oil by use of supercritical fluid extraction. A number of other Dalchini species prototypical could potentially be used as roots for essential oils. The chief chemical component of cinnamon oil is cinnamaldehyde-also known as cinnamic aldehyde- which comprises between 60-90% of cinnamon oil.[11]

MARKETED PREPARATION OF CINNAMON:

1. Cinnamon Oil - AOS 80[20]



Fig No 12: Cinnamon Oil.

Scientifically cinnamon is recognized as Cinnamomum Zeylanicum, is a little evergreen tree that associate to the Lauraceae family, local to Sri Lanka and India. It has been used to treat various health untidiness.

Benefits:

- Control vital fluid Sugar.
- lowers odd Breath or Mouth Freshener.
- Slow Down The let go Of Glucose in the vital fluid.
- Relieve The indication Of Respiratory Conditions.

2. Cinnamon powder [21]**Fig No 13:** Cinnamon powder.

When cinnamon is dried, it forms strips that wrap in rolls, called cinnamon cane(sticks). This cane should be grounded to make cinnamon powder. Kadamba's Organic cinnamon powder is a delicious product made by using the specially chosen Organic cinnamon cane, hence it grants the dishes a particular smell and taste.

Benefits:[22]

- Stop different sclerosis.
- Reduces the effects of peak fat meals.
- Lowers the chance of cardiovascular disease.
- Stop Alzheimer's disease.

3. Cinnamon Bay Capsules



Fig No 14: Cinnamon Bark Capsules.[23]

cinnamon bay helps maintain a good health glycemic stability by maintaining healthy vital fluid sugar metabolism. Dual extraction technology is used to deliver the broadest spectrum of herbal constituents for better results.

Benefits:[24]

- Lowers serum glucose volume in diabetic patients.
- Improves the body's immune system.
- enlarge insulin sensitivity and help cope or alter type 2 diabetes.
- possess an anti-clotting outcome on the blood.

CONCLUSION:

The cinnamon has been used as a spice for flavoring foods and a natural traditional remedy in many cultures throughout the world. The cinnamon shows the various activities like (antioxidant activity, anti-fungal, anti-microbial, anti-inflammatory activities). The cinnamon is used in the treatment of cancer, heart disease conditions, inflammatory conditions and also used in gastrointestinal disorder. Further studies shown that effectiveness of the active principle of cinnamon and their therapeutic effects in the prevention and treatment of such disease.

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