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COMPARITIVE STUDY ON INDIAN SPICES FOR CLOVE, CINNAMON, CORIANDER.

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Abstract:

Clove (Syzygium aromatic**)** Coriander (Corundum sativum**)** and Cinnamon (Cinnamomum verum) are most used spices in India and some other parts of the world. These plants are mostly grown in the areas like indonesia, northern africa, south western asia, and some europaen countries. These spices are rich in biotic compounds like aldehydes, terpenoids, flavanoids ,phenollic acids, tannins,linalool,linolenic acids, and vitamins which shows some bioactive functions like anti-diabetic,anti-viral,anti-cancer and anti-ulcer activity. In addition to the basic bioactive compounds like they are also rich in essential oil compounds namely eugenol, α-humulen, β-pinene, limonene are present in clove, whereas essential oils like linalool, geraniol, α-pinenes,γ-terpenes are present in coriander , whereas in cinnamon camphor, cinnamaldehyde, α-bergamotene, β- caryophyllene, eugenol etc are present. In addition to these bioactive functions these are also used as a spice in making of some recepies and acts as household medicines for treating Dental pain, GIT disorders, hay fever, mouth freshener etc.

Keywords: Eugenia caryopyllus (clove), Cinnamonum gelanicum (cinnamon), Coriandrum sativum (coriander), HPLC analysis, Anti-oxidant activity.

Introduction:

Now-a-days, spices are mainly used for flavoring and they also have certain medicinal properties and are used in medicinal and culinary purposes and are also used in pharmaceutical, perfumery, cosmetics and several other industries [1]. Spices play an important role in kitchen and also have medicinal properties like diuretic, eccoprotic, carminative effect etc. These are used as medicines from earlier. For health purpose spices are being used in curing diseases e.g., fenugreek, cumin, turmeric etc. In the kitchens of India all spices are used from ancient times [2].

Clove is dried bud of syzygium aromatium (lavang) tree and also from Eugenia caryophyllus from the Mirtaceae family, used as flavoring in food cuisines in form of clusters. The flower buds are of pale color and they turn in to green which turn to bright red, buds are ready for harvesting, when they have 1.5-2cm in length, and the optimum temperature is 20-30℃ [3]. They cannot tolerate water clogged conditions. They are native from the Maluku islands in east Indonesia, in 16th and 17th century they are introduced to Srilanka and in 18th century they are introduced in India by East Indian Company [4]. They require tropical and sub-tropical environments for their growth. Clove can also be grown in the following countries; Indonesia, Srilanka, India, Tanzania, Malaysia, Madagascar, and Pakistan. In Brazil clove is cultured in state of Bahia. Eugenol as main chemical constituent present inclove. An average 15–20-year-old tree yields 3-4 kg of dried clove buds. Approximately, 15-20% volatile oil can be produced from dried buds [5] [6].

Cinnamon is a spice acquired from the inner bark of several trees from the genus cinnamon they belong to the family lauraceous that is used in both pleasant and spicy food. Various cinnamon bark species were used as one of the most important and admired spices used worldwide not only for cooking but also in traditional and modern medicines. Nearly 250 species have been recognised among the cinnamon genus. The most important constituents of cinnamon are cinnamaldehyde and trans-cinnamaldehyde these were present in the essential oils, which was responsible for its fragrance and various biological activities [7],[8], [9] During embalming process, Egyptians employed cinnamon as well as the related spices, cassia as a perfuming agent and acts as preservative during winter. Around 1518, Portuguese traders found cinnamon at Ceylon, present (srilanka) and which were later taken by Britishers in 1784. Later, it had begun to be cultured in other parts of the world. The spice is obtained from the brown bark, which forms quills with longitudinal striations. The plant is indigenous to Srilanka, South eastern India, Indonesia, South America and West Indies [10] [11].

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Coriander it is a spice obtained from plant source belongs to genus and species coriandrum sativum belongs to the family apiaceae which are long used in both medicine and foods for long period [12]. This is available as both seeds and leaves. This is used as a spice in many food items. Linalool, geraniol, α-pinenes, γ-terpene are the important chemical constitutents. They also contain some essential oils (1-2%), fatty oils like oleic acid, linoleic acid, etc. It tastes little bitter and spicy [13]. Coriander grows more in western Asia & southern Europe. It is used in two forms - spice-seed, herb- flavor of leaves. Coriander seeds as well as its oil can be readily available in markets. The coriander seeds contain many plant derived properties like antioxidants, disease preventing &health promoting properties. TLC of methanolic extract indicates presence of linalool [14] [15].

Traditional medicinal uses of clove , cinnamon & coriander. Health benefits of clove, cinnamon& coriander are reported in classical literature of Indian, Greek, and Latin for thousands of years. They have both culinary and medicinal uses. Volatile oil is used to impart essence to perfumes soaps, tooth pastes, and pharmaceuticals [16].

Clove uses:

- Anti- bacterial activity
- Used as herbal mouth rinses
- Treat gingivitis
- Decreases oral inflammation
- Treat diabetes, cancer, obesity.
- Treat tooth decay
- Treat cardiac related problems [17].

Cinnamon uses:

- Used as flavoring agent.
- Treat diabetes
- Lowers the blood sugar level.
- Lowers the cholesterol in diabetic people.
- Decrease obesity and weight loss.
- Used for irritability in bowel syndrome.
- Heart diseases
- Alzheimer's disease
- Treat cancer, HIV, tooth decay, allergies, infection etc.
- Used as anti-oxidant, anti-inflammatory, anti-biotic etc
- Treat cardiac problems [18].

Coriander uses:

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- Carminative
- Seeds are chewed to prevent halitose (Unpleasant breath).
- To treat allergies, digestion, hay fever.
- Spice ingredient, flavoring agents.
- Used to treat anti-arthritis, anti-ulcer, anti-lipidemic, anti-spasmodic.
- Used as expectorant, anti-septic, anti-diabetic, diuretics etc.
- In smaller doses they can be used by pregnant women as well as nourishing mothers also [19].

Nutritional composition of clove, cinnamon& coriander:

Spices contain an impressive list of plant-derived chemical compounds that are known to have disease preventing and health promoting properties. They have been in use since ancient times for their anti-inflammatory, carminative, anti-flatulent properties. Clove used as a one of the major vegetable sources of phenolic compounds. Cinnamon which has immense medical potential it contains a no. of compounds, including essential oils that provide the spice flavor. The coriander seeds possess many plant derived compounds anti- oxidants, disease preventing & health promoting properties [20] [21].

Chemical composition:

CLOVE	CINNAMON	CORIANDER
Eugenol-(9381.70-1465.00) mg/100gm	Cinnamldehyde-(60-80%)	Essential oils -(1-2%)
Flavanoids	Eugenol-(5-10%)	Linalool-68%
Hydroxyl Benzoic acid	Camophor-60%	α-Pinene - 10%
Hydroxyl Cinnamic acid	Trans Cinnmaldehyde & β-Caryophyllene	Germinal
Hydroxyl phenyl propones	Terrene Hydro carbons-78%	Camphene
Tannins (2375.8 mg/100gm)	α- Bergamotene-27.38%	Oleic acid
β-Cariofilcoeno (5-15%)	α-Copaene - 23.05%	Linolenic acid
α-HumuleAnti-diabeticn (2.1%)	Oxygenated Terpenoids -9%	Palmitic acid
β-Pinene	Cinnamyl Acetate - 41.98%	Vitamins-A, C, K.
Limonene	Trans α-Bergamotene - 7.97%	Calcium
Farnesol	Caryophyllene oxide - 7.2%	Dietary fibers
Benzaldehyde	Vitamins (A, C, K, B3)	Magnesium

[22] [23] [24].

COMMON USES OF CLOVE, CINNAMON& CORIANDER.

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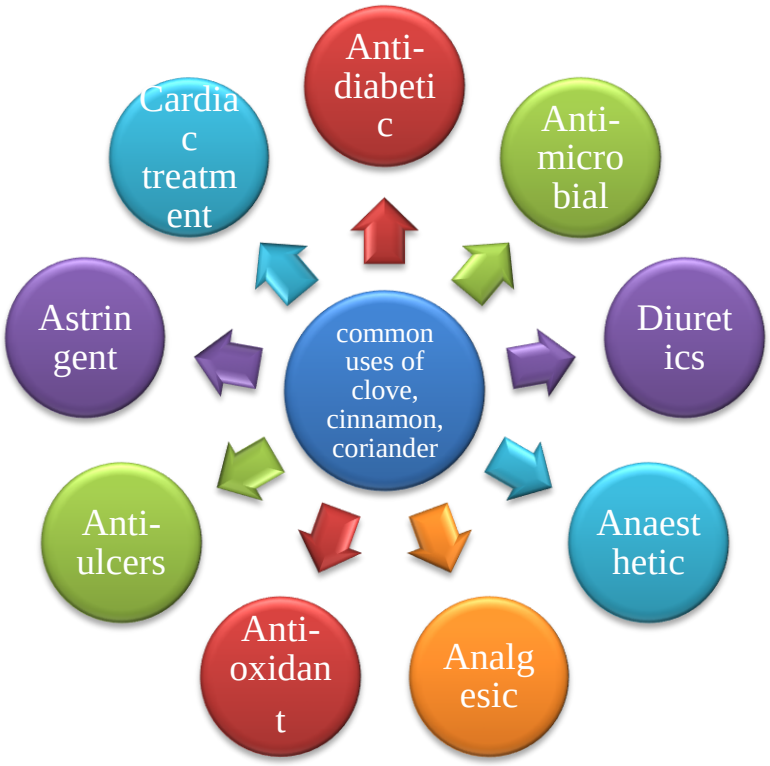

REPORTED ACTIVITIES:

Antioxidant activity:

Generally, phenol compounds and flavanoids are more essential for antioxidants activities. Hence to evaluate the anti-oxidant activity a study was performed for some of the species such as cinnamon, mint, clove, ginger, onion, coriander etc. All species inhibited lipid oxidation in a dose dependent manner. Among all the species the potent anti-oxidant activity was showed by clove whereas onion showed low activity when compared to above spices. By using the DPPH (2, 2-diphenyl-1-picryl hydrazyl) free radical quenching, BCB (β-carotene bleaching) and FRP (FE (III) reducing power methods we can evaluate the antioxidant activity of clove, sage and oregano oils. When compared to oregano oil, sage oil; eugenol oil shows more potent anti-oxidant activity [25] [26].

Anti-microbial activity:

Cloves also have been used as an anti-microbial agent against bacteria and fungi. The anti-microbial activity of clove, cinnamon, mint, ginger has been tested on E. coli, staphylococcus aurous and bacilli. Among all the above species clove shows the complete anti-microbial effect at the concentration of 3%. Good inhibitory action was also showed by clove at the concentration of 1% [27] [28].

Anti-ulcer activity:

Coriander is effective in treating mouth ulcers due to its soothing and refreshing effect. It also prevents colon ulcers by increasing liver activity for better digestion [29] [30].

Anti-diabetic activity:

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The powder of coriander is effective in reducing sugar levels by increasing insulin level and glucose uptake [31] [32] [33].

Anesthetic activity:

Clove also acts as an anesthetic agent. A study was performed for the clove and the MS-222 taken as a standard sample on oncorhynchus. The anesthetic activity of clove is due to the presence of "eugenol oil" [34] [35] [37].

Diuretic activity:

Coriander powder is a diuretic and helps to excrete toxins and extra water from cells, thus helps kidneys to pass out more urine and purifies the system and also helps in weight loss [36][38][39].

Analgesic activity:

Clove also shows an analgesic activity. A study was performed for the analgesic activity of clove and paracetmol both are induced intravenously to rabbits. The clove shows a greater analgesic potential when compared to the paracetmol [40] [41] [42].

Identification and chemical techniques:

Clove:

- Take a clove oil and dissolve it in alcohol (5ml) to this add a drop of fecl2, because of the presence of phenolic OH group of eugenol blue colour is obtained.
- Take a clove powder in a test tube, to this add Sudan (iii) red, color precipitate is formed confirms the presence of clove [43] [44].

Cinnamon:

Cinnamaldehyde was isolated using a separating funnel and identified according to tollen's test followed by detection on TLC plates in comparison with standard cinnamaldehyde that served as a positive control. Moreover, FTIR spectrometry and HPLC analysis were used to confirm the purity and identity of cinnamadehyde.

Chemical test: - ferric chloride +a drop of volatile oil =pale green colour [45] [46].

Coriander:

Extract of coriander was taken and qualitative analysis was performed using chemicals & carried out Preparative TLC study according to GCMS by using Methanol extract was performed. Linalool and other chemical constituents have been observed and identified [47] [48].

Toxicity:

The clove oil is considered non-toxic when it is administered in doses [<1.5g/kg]. 2.5mg/kg/day was used by humans where the limit was set by WHO. A study was performed on aquarium fish species to evaluate the clove oil toxicity. Whereas, in case of cinnamon Toxicity. Eating lots of cassia cinnamon could be toxic, especially if you have liver problems. Coumarin, an ingredient in some cinnamon products, can cause liver problems, but the amount you'd get is so small that it probably won't be a problem. Whereas in coriander linalool and umbeliferone may be toxic if taken in higher concentrations & may cause contact dermatitis [49] [50] [51].

Storage:

Store in an air tight container, at home store in dry cool and dark places. They are readily available in markets.

Adulterants: In some spices like coriander ,inferior variety like fenugreek seeds , cereals, fruits and similar seeds are mixed, in cinnamon some other barks are mixed in the pure product.

Conclusion:

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The present review concludes that the clove, cinnamon and coriander contain many medicinal and culinary uses, which cure many diseases and also used in many dishes. However; much study needs to focus on the synergetic effect of these compounds isolated from clove, cinnamon and coriander on various diseases.

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