WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 11, 2189-2201. Review Article ISSN 2277–7105

CASSIA CINNAMON IS A TRADITIONAL HERB WITH POTENTIAL MEDICAL AND THERAPEUTIC USES

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Article Received on
20 April 2024,

Revised on 10 May 2024,
Accepted on 30 May 2024

DOI: 10.20959/wjpr202411-32731

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ABSTRACT

Cinnamon, commonly known as Dalchini in India, is an aromatic spice derived from the inner bark of trees belonging to the genus Cinnamomum. As a staple in Indian cuisine, it not only enhances flavor but also contributes to the food's health benefits. Many researches were performed and several journals of PubMed, Science direct, Elsevier, Scopus were used for preparing this article by using keywords like Cassia cinnamon, Cinnamaldehyde, Eugenol, Antibacterial Antimicrobial and Chinese cinnamon.The aim of this review is to summarize the previously reported Pharmacological, Phytochemical, Pharmaceutical status of the chosen Chinese plant species. Our findings shows that C. cinnamon includes a broad range of physiologically active chemicals, such as cinnamonaldehyde, cinnamic acid, eugenol. Moreover, past research has shown that C. cinnamon plant extracts and extracted principles have substantial pharmacological action, including anti-microbial, anti-bacterial, antioxidant, anti-fungal and other properties. Research indicates that C. cinnamon holds significant promise for the creation of medicinal and supplemental treatments aimed at the prevention and management of conditions such as acne, pain, ulcers, and diabetes. Clinical studies have confirmed the safety and efficacy of C. cinnamon for human use. Ongoing investigations continue to reveal its effectiveness in antimicrobial, anti-inflammatory, antibacterial, and antioxidant actions, as well as its role in promoting overall health. C. cinnamon is a important source of bioactive compounds that may be use in the treatment of diseases. This review paper synthesizes the current literature to present a comprehensive

overview of the pharmacological actions of cinnamon, evaluates its potential as a multifaceted therapeutic agent.

KEYWORDS: Cassia Cinnamon, Cinnamaldehyde, Antibacterial, Antimicrobial, Traditional Use, Chinese Cinnamon.

INTRODUCTION

Cinnamomum cassia is commonly called Chinese cinnamon or Cassia cinnamon. It is a frequently used spice in North America and the entire world at large. Though it is one of many species that give rise to cinnamon, it is often referred to as "cinnamon" in North America. Other common names for this plant are Cassia bark or Cassia spice.

The synonym of cinnamon is Dalchini, or cinnamon bark. It belongs to the family **Lauraceae**. It is a small tree. The length of this tree is 10–15 meters. It has distinct odors; flowers have a greenish color arranged in panicles, and the color of the fruit is purple.[1] It is distributed in around 250 species in various regions of Asia, the Pacific Islands, subtropical and tropical areas, and nearly 50 species in China.[2] Due to the presence of aromatic essential oils, cinnamon has a sweet and woody flavor. It helps with digestive problems and also treats diarrhea. It has high antioxidant activity, has antimicrobial properties, and works as a preservative in food.[3] Cinnamon gives flavor to food. Many Indians use this to add flavor to food. It also increases the quality of food. Including this, many other species are used as preservatives to increase the shelf life of food and prevent spoilage. They have many other antioxidant properties, including anti-cancer, anti-microbial, anti-inflammatory, and anti-diabetic properties that help the human body fight against disease.[4] For the prevention of coronary artery disease, it is also used as a dietary supplement and an anti-inflammatory supplement.[5] Cinnamon inhibits prostaglandin, which initiates pain, so it helps reduce pain. The main component of cinnamon is cinnamonaldehyde, which works against platelet coagulation in blood so blood flows do not stop. It also inhibits the inflammatory response from the cell membrane that was triggered by the release of arachidonic acid. It is very useful in rheumatoid arthritis and the pharmacotherapy of inflammatory diseases. Its scent and smell improve memory and virtual memory due to cinnamic aldehyde.[6] Chemicals that are isolated from cinnamon are terpenes, lignans, alkaloids, phenylpropanoids, coumarins, etc. More than 80 compounds were separated from different parts of cinnamon.[7] The major component of leaf oil is eugenol, whereas cinnamaldehyde is present in stem bark. In fruit flowers, trans-cinnamyl acetate is

present.[8] Cinnamon also shows benefits to diabetic patients; it helps reduce fasting blood glucose (FBG) and HOMA IR homeostatic model assessment for insulin resistance.[9]

Figure 1: Cassia Cinnamon.

METHODOLOGY

The review paper was prepared after reading all the literature about medicinal plants available in the latest journals. Many research studies were performed in the journals used for preparing this paper: PubMed, Science Direct, Elsevier and Scopus, and many searches were done on Google Scholar. For the preparation of this paper, we focused on the latest published papers on cinnamon extract. In this paper, we cover the Introduction part and the chemical constituents present in it. Traditional and pharmacological uses.

Taxonomical Classification of Cinnamon[10,11]

Kingdom: Plantae

Division: Tracheophyta

Class: Magnoliopsida

Order: Laurales

Family: Lauraceae

Genus: Cinnamomum

Species: cassia

Botanical name: Cinnamomum zeylanicum

Common name: Chinese cinnamon

Various Pharmaceutical Formulations of Cinnamon.

Sr. No.	Formulations	Application	Marketed formulations	References
1.	Capsule	Supplement	Organic India	15
2.	Cream	Antimicrobial	Fresh boost day face cream	16
3.	Bath bomb	Muscle Relexant	Blush-berry bath bomb	17
4.	Peel off mask	Antioxidant	Assure natural mask	18
5.	Lipstick	Moisturizing	Just herbs	19
6.	Body scrub	Cleanser	Organic shop body scrub	20
7.	Cream	Antibacterial	Natural secrets herbal cream	21
8.	Ointment	Dermatitis	Lotus herbals ointment	22
9.	Gel	Wounds	Raaga professional gel	23
10.	Concealer	Acne	Lovechild Mashaba concealer	24
11.	Body wash	Anti-inflammatory	Vaid Rishi	----------
12.	Hand wash gel	Antibacterial	I-safe hand wash gel	25
13.	Serum	Hyperpigmentation	Brownskin beauty	---------- --
14.	Face wash	Anti-acne	Alainne	26
15.	Tablet	Nutraceuticals	Himalaya	27

Cinnamomum Cassia's Several Pharmacological Attributes

Anti-oxidant

Antioxidants are very important in human life; they are present in natural foods. They are also used in food for flavor. Cinnamon also has antioxidant compounds and works as a major source of antioxidants. Ervina et al. show that it has high antioxidant properties due to the presence of volatile oil and polyphenol compounds found in cinnamon bark[28] reported that antioxidants prevent free radical chain reactions of oxidation; that's why they are added to food preparations; they terminate free radical reactions by stopping all the factors that initiate these reactions.[29]

One more investigation shows that C. cassia has flavonoids that have antioxidant properties. In this investigation, flavonoids are extracted by ethyl acetate, and n-butanol has the ability to scavenge ABTS free radicals and DPPH. At the end, the result shows that it has good

antioxidant properties (IC50 was 6.13 µg/mL of n-butanol) and ethyl acetate (IC50 was 6.37 µg/mL of ethyl acetate).[30]

The investigation done by Lee et al. (2015) the ethanol extract of C. osmophloeum leaf tested using the FRAP assay and DPPH at the end resulted in 38.97 and 0.48% inhibitory values. And one more investigation by Lin et al. (2007) shows an IC50 29.7 µg/mL assessed using a DPPH radical scavenging assay.[31]

Antimicrobial activity

There are so many antibiotic consumptions going on now, but due to this, antibiotic resistance is occurring in the body, which does not show the desired effects. There is also a big failure of chemotherapeutic drugs due to antibiotic resistance. The growing antibiotic resistance of microbes is a big concern globally. That's why herbal formulations are safer. That's why so many researchers research plants because they have no adverse effects. Cinnamon has high antimicrobial activity, as documented by Vasconcelos, Croda, & Simionatto (2018) and Wisal (2018). Its hydrophobic nature shows that its antibacterial action inhibits bacterial cell growth. Decrease microbial cell growth by stopping its metabolism and restricting replication. (Kothiwale, Patwardhan, Gandhi, Sohoni, & Kumar, 2014).[32]

Cinnamon bark has Anti-microbial activity reported by Matan et al. The combination of cinnamon oil volatile gas phase and clove oil inhibits the growth of spoilage yeast, bacteria, and fungi normally found on intermediate moisture food after being combined with an atmosphere that is modified with a high concentration of carbon dioxide and a low concentration of oxygen.[33]

Anti-ulcer

Cinnamon has antioxidant activity in the human stomach; it shows a good effect in the stomach environment due to its low pH resistance and good efficiency in liquid medium, as reported by Tabak et al. Kreydiyyeh, one report also came that cinnamon has an inhibitory effect on Na+ and K+ ATPase activity in the kidney and intestine on alanine transport in the jejunum of rats.[34]

One more study shows that the suspension of cinnamon decreases the volume of gastric acid secretions in Pylorus-ligated rats. In this study, gastric hemorrhagic lesions are inhibited by

the cinnamon suspension and are induced by 80% ethanol. Against indomethacin, anti-ulcer activity is shown by cinnamon.[35]

Anti-Diabetic

In this study the extract of Cinnamon cassia anti diabetic activity is checked in type II animal model. For six weeks, different doses of cinnamon were administered (50, 100, 150, and 200 mg/kg). The results show that it suppresses the blood glucose effect by improving insulin sensitivity and regulating blood glucose levels. decrease glucose level, total cholesterol concentration, triglycerides, and lipids after six weeks, and also decrease carbohydrate absorption in the small intestine. This shows that cinnamon has an anti-diabetic effect.[36]

Now a days, it has been seen that up to 72.8% of patients used herbal medicines for diabetes; cinnamon was also used a lot over the last decade. Many other medicinal plants are used to control diabetes globally. Cinnamon is one of the medicinal plants used to control diabetes mellitus.[37]

Anti-inflammatory

One study was done by Tung et al. He explained that the essential oils present in cinnamon osmopholeum have anti-inflammatory properties. The anti-inflammatory and cytotoxicity activities are checked against the Human Hepatocellular Liver Carcinoma Cell Line. This study also shows that cinnamon suppresses the nitric oxide that is produced by lipopolysaccharide. So, all this shows that the components present in cinnamon have excellent anti-inflammatory activity.[38]

More research has been going on. One more study shows that Cinnamomi ramulus has strong anti-inflammatory activity. A study is going on in which neuroinflammation is induced by LPS (lipopolysaccharide) after being treated by Cinnamomi ramulus. The results show that it stops the increased levels of interleukin, nitric oxide, and cyclooxygenase 2, which are all responsible for inflammation.[39]

Analgesic

Cinnamon bark is a medicinal plant that has both analgesic and anti-inflammatory effects in vitro. There are many constituents inside bark that have these property compounds, including coumarin, cinnamonaldehyde, cinnamon alcohol, and cinnamon acid. In this activity, the activity is checked by using the Winter method and rats. In this study, 5 groups are taken for

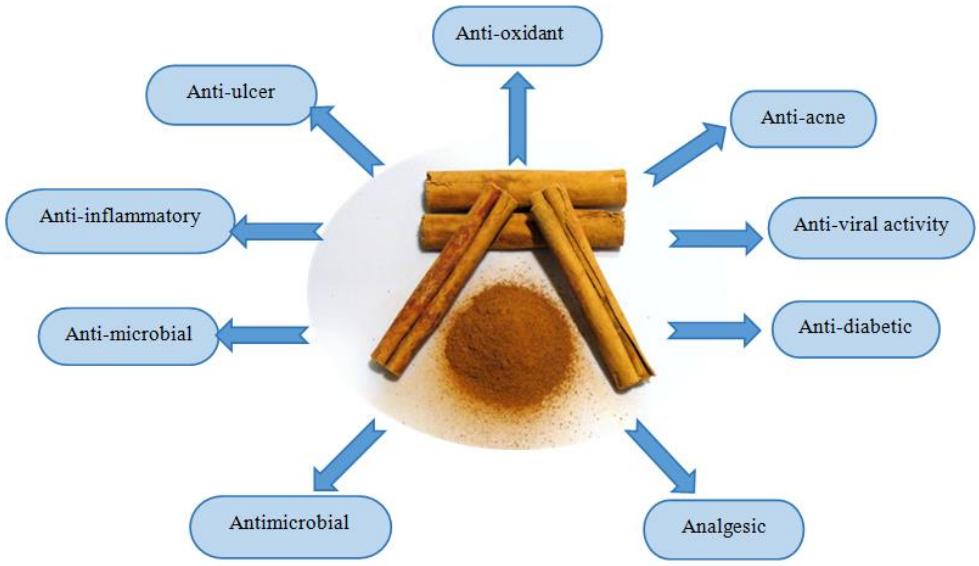
different dosages of extract (300, 400, and 500 mg/kg), and one group is the positive control (sodium diclofenac) and one is the negative control (aquadest). After a statistical test, the result shows that cinnamon that is extracted with 70% ethanol shows anti-inflammatory and analgesic effects.[40]

In this study, the model that is used is a general linear model to compare groups. In this study, a visual analogue scale (0–10) is used for assessing wound healing and perinal pain, and a scale (0–15) for edema, discharge, redness, and ecchymosis. At the end, after all outcomes, the results show that cinnamon is used for improving healing in episiotomy incisions and also for decreasing perineal pain.[41]

Anti-acne

Due to high sebum production, Acne vulgaris occurs. It is a dermatological disease that also occurs due to hormonal changes, hyperkeratinization, and bacterial infection. Some bacteria, such as Staphylococcus aureus and Staphylococcus epidermidis, cause inflammation in acne. There are many essential oils, like Cinnamomum burmannii, that have antibacterial activity against S. epidermidis. This study shows that cinnamon has the ability to fight against bacteria associated with acne.[42]

Cinnamon oil is also used as a cosmetic product against acne. In the study, 5 formulations of concealer with 0.5% w/w cinnamon oil were prepared. Some showed nice covering, good texture, and good spreadability in the skin with anti-P. So cinnamon shows good effects against acne.[43]



CONCLUSION

The realm of medicinal plants is vast and incredibly significant for the advancement of pharmacological research and the development of new drugs. It is estimated that approximately one-fifth of all plants have medicinal properties that can be harnessed for therapeutic purposes. Among these, cinnamon bark stands out due to its rich composition of bioactive compounds such as Eugenol, Cinnamic acid, Cinnamaldehyde, and a variety of essential oils. Cinnamon is renowned for its extensive range of pharmacological effects. It acts as an anti-acne, anti-bacterial, anti-diabetic, and anti-ulcer agent, among other beneficial activities. Its safety profile is well-established, making it suitable for use in animals. In India, cinnamon has been utilized for an extended period as a spice, integrating seamlessly into daily life. The comparative safety and fewer side effects of herbal medicines like cinnamon, especially when contrasted with allopathic treatments, underscore the pivotal role that herbal medicine plays in healthcare. This is particularly relevant in a world where the pursuit of safer and more natural treatment options is ever-increasing. Herbal medicine, therefore, represents a vital component of both traditional and modern medicinal practices, offering a complementary approach that aligns with the global shift towards holistic and preventive healthcare paradigms.

Author's Contribution

Pratibha Sharma - Data Collection & Writing the manuscript; Mukesh Kumar & Bhumika - Supervision.

Consent for Publication

All authors agreed on the publication.

Funding

None.

Conflict of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ACKNOWLEDGEMENT

Pratibha Sharma thanks to the management, IIMT College Of Medical Science Meerut,, India, for providing necessary facilities to accomplish the paper.

We are extremely thankful Associate. Professor Mukesh Kumar, Faculty of IIMT College Medical Sciences, Department of Pharmaceutics, IIMT University of Meerut, Asst. Professor, Bhumika Faculty of Pharmacy, Department of Pharmaceutics IIMT University of Meerut, for their input and support throughout the work.

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