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Saleekha(Cinnamomum Cassia Blume): A Review

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ABSTRACT

Cinnamomum cassiaBlume(Cinnamon) is a well-known traditional medicine with therapeutic benefits for centuries. The plant *Cinnamomum cassia Blume* is commonly known as Chinese cinnamon. Mostly its bark and leaves are used in medicine. *C. cassia* is safe when used in small amounts as in foods and medicinal doses. *Cinnamomum cassia Blume* (Family: Lauraceae) is often used as a substitute for cinnamon. The bark of cassia is coarser and thicker with a more intense aroma than the true cinnamon, *C. verum*. Around 250 species of this genus are identified around the world. The Chinese cinnamon bark (*C. cassia*) contains, cinnamon oil, cinnamaldehyde, eugenol, It also contains mucilage, starch & tannin, cinnamyl acetate, cinnamic acid, phenyl propyl acetate, orthocumaric aldehyde, tannic acid, and starch. Cinnamaldehyde- showed potent anti-bacterial and anti-fungal activities. The whole plant is medicinally important in the Indian traditional system of medicine. In this review, the reported pharmacological activities of *C. cassia Blume* to cure or prevent several diseases. Different pharmacological activities like anti-inflammatory, antioxidant, hepatoprotective, antihyperlipidemic, antidiabetic, antimicrobial activity activities of *C. cassia Blume*. The present article describes a detailed review of literature for this plant species including taxonomy pharmacology and photochemistry in an organized way. This review paper will surely serve as an important source for future scientific investigations on this plant.

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INTRODUCTION

Cinnamomum is derived from the Greek word 'kinnamomon' which means 'spice' and 'sweet wood'.^{2,3} *Cinnamomum cassia* Blume, also known as *Cinnamomum aromaticum* Nees,^{3,4} Chinese cinnamon^{5,6} because it is native of China. Cinnamon is an ancient spice used in many countries. It consists of the dried inner bark of *Cinnamomum cassia* Blume (Lauraceae).⁹ Mostly its bark and leaves are used in medicine. *C. cassia* is safe when used in small amounts as in foods and medicinal doses.⁶ Cinnamon was mentioned in the bible and imported to ancient Egypt from China. 2000 BC.⁷ In the Unani system of medicine it is called "Qasya". There are several varieties but the best one is reddish in colour.⁸ Cinnamon is an ancient spice used in many countries. Genus *Cinnamomum*, first described in 1760.¹⁰ Around 250 species of this genus are identified around the world.² The Chinese cinnamon bark (*C. cassia*) contains, cinnamon oil, cinnamaldehyde, cinnamaldehyde- showed potent anti-bacterial and anti-fungal activities.⁴ The stem barks are used to treat gastrointestinal neurosis, diarrhea, amenorrhea, dysmenorrhea, impotency.¹⁰ Studies have confirmed *C. cassia* has a wide range of pharmacological effects including antitumor, anti-inflammatory analgesic anti-diabetic anti-obesity astringent, carminative, antifungal, antiseptic, antibacterial, antifungal, and antiviral effect and other effects.^{2,11}

SYNONYMS

Cinnamomum aromaticum Nees,^{10,16,17} *Cinnamomum longifolium*¹⁶ Chinese Cinnamon^{14,17} Bastard Cinnamon¹⁷ *Cassia lignea*, *Cassia* Bark, Canton Cassia¹⁷



Fig.1: Saleekha (*Cinnamomum Cassia Blume*).a.Plant b. Bark¹.

Table 1: Taxonomic Details of Saleekha (*Cinnamomum cassia Blume*).

Kingdom	Plantae
Sub kingdom	Tracheophytes
Superdivision	Angiosperms
Division	Magnoliids
Class:	Magnoliopsida
Order:	Laurales
Family:	Lauraceae
Genus:	cinnamomum
Species:	Cassia ¹⁶

Part used: Cinnamomomi Cortex, and essential oil¹⁸

Part studied: Bark¹⁹

Vernacular names:

Arabic: Rehan al-jamal⁸ salikha^{20, 21, 22} taj¹⁹

Chinese: Chun Kou chou¹³

Persian: Ashtargayah⁸ qurfa^{20, 21} taj^{13, 22}

Urdu: Taj¹³ qirfa, sajaz hindi, saleekha, salikha, , taj qalmi, tezpat¹⁹

Hindi: Taj^{8, 23} dalchini, daruchini¹⁹

Ayurvedic: Tavk^{9, 14}, daalchini¹⁴ darusita⁹

Tamil: Nattaichuri¹³, lavangappattai¹⁴ elavangappattai, ilavankappattai, karuvappattai, lowangappattai¹⁹

Kannada: Dalchini, daruchini

Malyalam: Lowangappattai¹⁹

Sanskrit: Coca, gudatvac, thracham, thwak, tvak, twak, varanga, varangam¹⁹

Telugu: Madana¹³ Lavangappattai¹⁸ lowangappattai¹⁹

Punjabi: Kirfa¹⁸

English: Camphor tree, Formosan wood¹² Chinese Cinnamon¹³ Chinese cassia¹³ Cassia Bark¹⁴ cassia lignea¹⁹ bastard cinnamon, *Cinnamomum cassia*¹⁹

Unani name: Aslayūs, qasa, qasya, qasyūsūs⁸ qanizetrās²⁴

Mahiyat:

Cinnamomum cassia is an evergreen aromatic tree¹⁶ it is propagated by seed³ The peel of a tree is like cinnamon verum but thicker, rough texture, more difficult to crush than that of cinnamon verum. that tastes and smells like cinnamon verum^{16,21} The leaves of it are similar to *sawasan* The branches are thin & smooth. It is long & seems to be bulging⁸ The flowers are white and often grow on twigs. The fruit is round, half an inch long, and turns black when ripe²⁰ It has a similar taste & odour as *qaranfal* & *dārchini* but the tree is long compared to *dārchini*.²⁴ There are several varieties, the best one is reddish in colour, thick strong odour, sweetish sharp & a little bitter to the taste²³ The height of this tree is about 30-35 feet and diameter of the stem is 4-5 feet. The bark is tarnished and sticky to taste. Its color is brown or yellowish like cinnamon.²⁰

Mizaj(temperament): Hot 2° & Dry 2°^{20,23} Hot 3° & Dry 3°²³

Miqdare-i- Khuraq(Therapeutic doses): 2-3 gm^{20,21} 4-7gm²⁴ 1-3 gm¹⁵

Muḍir(side effects): Amāde-i- gurda²⁰ ānto²⁴

Muṣleh(corrective): katira²⁰ wasapistān²⁴

Badl(substitute): Darchini^{20, 23}

Nafa-i-Khas(important properties): Muqawi-i- me'da wa kabid^{20,21} muhalil-i- awram, Ahsha wa reya²⁵

Af'āl(action) Kāsir-i- riyāh(carminative)^{15,20} muqawi-i-aza-i-badan^{21,22} muddir-i-hayd (emmenagogue)^{13,20} munffith-i-bulghum.(Expectorant)^{15,20} qabiz(Astringent)²⁰ mukhrije janeen wa mushima(expulsion of fetus & placenta)^{8,24} and mukhrije deedan-i-ama(vermifuge)²⁴ muddir-i-Bawl(diruretic)^{15,24} muqawwi-i- me'da (Stomachic)^{13,17,18} muqawwi-i- Jiger(liver- tonic) Nervine disease likelaqwa(facial palsy), šara' (epilepsy), waja-al mufassil(polyarthritis)²³ Mukhrij-i- janeen wa hasa (abortifacient,lithotriptic), munaqiye-i- rhim²² muhalil-i-warm(anti-inflammatory)²⁵ mufri-i-munaqiye-i- qalb(exhilarant) , hazim(digestive)¹⁵

Is'temal(uses):

Due to its astringent property, it is used in diarrhea in the form of powder along with the proper drug. It is used in cough & cold as *laūq*²¹ Its local application along with honey is beneficial in acne. It is beneficial in cobra bite & *Darde gurda(kidney pain)*. Sitz bath or *Dhooni*(vapour) is used to constrict the vagina (*Muzayyaq-i- farj*)⁸ Complete abortion occurs after using this drug. *Dimad*(paste) is applied over the forehead for headaches & cold.^{8,15,24}

It provided a pleasant odour in the uterus as a *Dhooni* application. It is used in pain of chest & stomach by evacuation of *fuzlāt*(waste product). It is useful in *amenorrhea*⁸ *Dimad* with *Sirka* is useful in *aurām*(inflammation), *jarb*(scabies) & *quba*(fungal infection)²³ It is useful in dysuria, burning micturition, cough, improve in voice *Joshānda*(decoction) is used to expel out dead fetus It is useful in dysuria, burning micturition, cough, improve in the voice²⁴ *Safūf*(powder) of *taj* useful in *zoāfe me'da*, (weakness of stomach) *naḥkh-i- shikam*(indigestion) *zoāfe Jiger*(weakness of liver) *Joshānda* of *taj* is used in *Ihtibas-i-bawl wa hayd*, (anuria, *amenorrhea*)¹⁵ Bark possess antibacterial, uterotonic, respiratory, stomachic properties^{12,17} cinnamon useful for women's health as it helps in providing relief from menstrual cramping and other feminine discomforts. Cinnamon may significantly lower LDL (Low-Density Lipo Protein) or "bad" cholesterol and triglycerides and total cholesterol. By taking ½ teaspoon of cinnamon per day it can improve insulin resistance and it can help in weight control.³

Murakkaba(important formulations): *Jawārish jālinūs*, *Dawa-ul-kurkum- kabir*, *Tiryāqe-i- samaniya*¹⁵

The ethano botanical description:

Bark: It is a golden red bark that thick up to 1.5 cm that is dried and is the cinnamon spice. The small or medium-sized tree usually up to 20-40 ft³ bark may be easily distinguished from that of cinnamon, as it is thicker, coarser, darker, and duller flavor being more pungent, less sweet & delicate slightly bitter¹⁷

Fruits: The fruit is round, half an inch long, and turns black when ripe²⁰ The fruit is about the size of a small olive¹⁷ pulpy, aromatic, elliptical, drupes with a single seed³.

Flowers: Flowers are small, on slender pedicles of about the length of perianth slightly silky, cymose panicles in the axils of the leaves²⁶ yellow in color, inconspicuous, paniculate.³ The flowers are white and often appear on the branches²⁰

Leaves: These are oblong-elliptic, ovate shapes dark glossy green and with three prominent nerves from the base. Leathery and approximately 7 – 20 cm in length.^{3,26}

Taste: Sweetish sharp test¹³

Habitat: Native to China, Southeast Asia, Indonesia, and Vietnam^{3,16} china, Burma, Sri Lanka.¹³ Kashmir Shimla, UP Bangal, Himalaya., Burma²⁰ cultivated in Sumatra, Ceylon, japan, java, Mexico, & South America.¹⁷

Phytochemical constituents:

Phytochemical of *c.cassia* more than 160 components have been separated & identified from the plant. Among them, Terpenoids are the most abundant phytochemical. & phenylpropanoids are the bioactive components, cinnamaldehyde is considered as the representative component of this plant¹¹ Terpenoids are the main compounds in the essential oil of *C. cassia* (strong antibacterial, antiviral, antitumor and anti-inflammatory effects)⁹ Bark have 1-2% volatile oil containing cinnamaldehyde(82.2%) and eugenol (1.5%) as major constituents. It also contains mucilage, starch & tannins^{9,27} cinnamyl acetate, cinnamic acid phenyl propyl acetate, orthocumaric aldehyde, tannic acid and starch¹⁵

Pharmacological studies:

Research has focused on different pharmacological activities, such as anti-inflammatory, antioxidant, hepatoprotective activities, of *C. cassia* Blume⁹

Anti-inflammatory and analgesic activity:

The strong suppression of nitric oxide (NO) and cyclooxygenase by *C. cassia* has been demonstrated to have anti-inflammatory effects.⁹ Carrageenan was introduced in the mouse model to cause paw edema. The edema was shown to be limited by cinnamaldehyde infusion by suppressing NO, TNF- α , and PGE2. This suppression by cinnamaldehyde is due to inhibition of iNOS, COX-2⁵ In 2017 Shin et al. confirmed that ethanol extract of *C. cassia* had a noticeable anti-inflammatory effect.¹⁰

Anti-hypertriglyceridemic activity

Cinnamon has been found to be beneficial for improving the blood lipid profile. Kim et al. found that the concentration of TG and total cholesterol became significantly lower after consuming cinnamon extract (200 mg/kg body weight) for 6 weeks. At the same time, the HDL cholesterol significantly increased. Cinnamaldehyde has significant hypolipidemic effects. It can significantly reduce lipid concentrations and increase HDL cholesterol in serum. One possible mechanism is that cinnamaldehyde could increase the activity of lecithin cholesterol acyltransferase. Polyphenols present in cinnamon may influence lipid metabolism. Polyphenols effectively inhibit hepatic lipid peroxidation. This activity is beneficial for human health since lipid peroxidation produces some products that exert cytotoxic and genotoxic effects.²⁸

Antimicrobial Activity:

C. cassia had a broad-spectrum bacteriostatic effect. Zhong et al found that the total polyphenols in the non-volatile parts of *C. cassia* branches exhibited antibacterial activity *in vitro* against Gram-positive (*Staphylococcus aureus* and *Streptococcus pneumonia*) and Gram-negative (*Escherichia coli* and *Pseudomonas aeruginosa*) bacteria.¹⁰ Ethanol extract of *C. cassia* has shown to have strong activity against *Pseudomonas aeruginosa*. (Sharma et al., 2009). Pure cinnamaldehyde and its oil extracts were found to be effective against *Staphylococcus aureus*, *Escherichia coli*, *Enterobacter aerogenes*, *Proteus Vulgaris*, *Pseudomonas aeruginosa*, *Vibrio cholera*, and *Salmonella Typhimurium*) using the agar dilution technique.⁵

Antioxidant activity

Flavonoids of *C. cassia* showed good antioxidant activity. The flavonoids, obtained by fractional extraction of ethyl acetate and n-butanol¹⁰ *cassia* ethanol extract has significant anti-oxidant properties (Boga et al., 2011)⁵

Anti-tumor Activity

Cinnamaldehyde has been reported to exhibit anticancer properties. Wang et al. revealed that cinnamaldehyde exhibited anti-tumor biological activity against cervical cancer cells by participating in the regulation of the PI3K/Akt/mTOR signaling pathway in cells¹⁰ Production of NF- κ B, which is activated by IL-1 β and TNF- α during inflammation, leads to cancer development. Therefore, the ability of cinnamon to inhibit the production of IL-1 β and TNF- α is one of the modes of action of cinnamon to prevent the development of cancer cells. Ariaee-Nasab et al. reported that the water extract of *C. cassia* (8 mg/mL) can inhibit tumor cell growth by hIAPP fragmentation when it was evaluated in humans²⁸

Anti-diabetic

Cinnamon has insulin secretagogue and insulin-sensitizing properties. Insulin signaling pathways are upregulated in skeletal muscles leading to increased glucose uptake. This was illustrated by showing increased expression of insulin-dependent substrates i.e. IRS-1/PI 3-kinase on mice models (Qin et al., 2003)⁵ Some studies have been conducted to evaluate the ability of cinnamon to reduce the risk of diabetes. *C. cassia* extract (200 mg lyophilized extract/kg mice body weight) has been reported to have a regulatory role in decreasing blood glucose levels in type-2 diabetic animal models. The decrease corresponds to the concentration of the extract. In addition, serum insulin became significantly higher during the treatment. In another study, applying 100 mg/kg of cinnamon essential oil (containing cinnamaldehyde 78.51%) to KK-Ay mice resulted in a similar phenomenon during 35 days of investigation. In an advanced study of chronic kidney disease associated with diabetes²⁸

Hepatoprotective Activity

Hepatoprotective efficacy of *C. cassia* extract against alcohol and carbon tetrachloride-induced liver damage has been found. Its capacity to scavenge free radicals might explain its hepatoprotective benefits. When compared to untreated rats, oral treatment of 200 mg/kg of water and ethanolic extracts once daily for 7 days corrected the carbon tetrachloride-induced elevations in serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT). Furthermore, the ethanolic extract showed a stronger hepatoprotective effect than the water extract by lowering MDA levels and boosting a⁹

Antiulcer Activity

cassia has effective antiulcer activity probably by potentiating the defensive factors through the improvement of the circulatory disorder and gastric cytoprotection. Akira et al. found that the intraperitoneal administration of an aqueous extract of *C. cassia* to rats at a dose of 100 mg/kg body weight prevented the occurrence of stress ulcers and strongly inhibited gastric ulcers induced by subcutaneous injection of serotonin in rats. Cinnamon extracts in ethanol and methylene chloride were investigated for their effect on *H. pylori* growth and urease activity. At concentrations comparable to those observed in conventional antibiotics, methylene chloride extract inhibited *H. pylori* growth, but ethanol extract inhibited urease activity. So, it may be helpful for the prevention of ulcers induced by *H. pylori*.

CONCLUSIONS

In conclusion, the traditional usages, phytochemistry, pharmacological activity, and toxicity of *C. cassia* have been summarized in the present review. Many studies have confirmed that *C. cassia* has a wide range of pharmacological activities, including anti-tumor effects, anti-inflammatory and analgesic effects, anti-diabetic and anti-obesity effects, antibacterial and antiviral effects, for which it has been used in the clinic in many countries. Moreover, *C. cassia* has the same origin as medicine and food which is often used as a condiment in our daily life. Nevertheless, there is still a lack of sufficient research about the alimentotherapy, health products, toxicity, and side effects of *C. cassia*. Therefore, more investigations need to be done in *C. cassia* in the future. Traditional medicinal uses, the bark, and twigs of *C. cassia* are important components the study on other parts of *C. cassia* may be helpful to the development of alternative medicines and new drugs. Fourthly, the bark is an important part of the tree body, which can maintain the temperature, prevent diseases and pests, its main function is to transport nutrients for the tree body *C. cassia* was traditionally used in the treatment of dyspepsia, gastrointestinal diseases, irregular menstruation, and arthritis, etc., but not all of these uses had been confirmed by modern preliminary studies, the more potential pharmacological activity of *C. cassia* might be explored in the future.

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