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### CINNAMON: AN IMPERATIVE SPICE FOR HUMAN COMFORT

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**Abstract:** Cinnamon is a spice that has ancient origins and is popularly used as flavorings, as a condiment and in cooking. Cinnamon is also known to provide various medicinal benefits that include lowering of blood cholesterol, for diabetes. Cinnamon is obtained from the bark of the Cinnamon tree.. The importance of cinnamon in cookery and medicine has been known since time immemorial, which is evident from the fossil remains that interpret its cultivation in ancient times. Today, It's not only known for as a strong flavored spice, but it has gained tremendous applications in therapeutic intervention. The bark itself is used for extracting essential oil. As far as cinnamon nutrition is concerned, it contains more than 80 nutrients, beneficial for proper functioning of the body. The unique aroma and pungency of cinnamon are attributed to the compounds cinnamaldehyde and cinnamic aldehyde. Giving due importance to the health benefits of cinnamon, rigorous studies have been done regarding the nutrition facts. Low in cholesterol, saturated fats, sugar, and sodium, It's an excellent flavoring ingredient for people with heart related problems. Cinnamon contains polyphenols, which are natural antioxidants, that help in regulating blood sugar levels. Certain compounds present in cinnamon stimulate the insulin receptors and thus help the body to use up glucose in the right way. Studies have shown that cinnamon can prove beneficial for those who suffer from diabetes, especially type 2 diabetes. Cinnamon improves insulin resistance, that helps in weight control. This explains the use of cinnamon for weight loss. The total calorie content in 6.8 g of cinnamon is 17. Out of this, only 1 calorie is contributed by fats (total fat content is 0.2 g per 1 tablespoon) and zero % from saturated fats. Overall, It's good for health conscious people. The amount of carbohydrates in 1 tablespoon serving size is approximately 5.5 g. Unlike other carbohydrate containing food items, it shows a negligible amount of sugar (only 0.1g per 1 tablespoon). The high %age content of dietary fiber (3.6 g in 1 tablespoon) also makes it a preferred spice among people having digestive problems. Using it regularly will reduce indigestion, constipation, and intestinal disorders. The concentration of protein in cinnamon is relatively low, as compared to that of calcium, iron, and dietary fiber content. Serving 6.8 g of the same will provide you 0.3 g proteins. Needless to say, you get proteins from other food ingredients. So, It's not at all a concerning issue. It's good source of calcium and iron; having 1 tablespoon of cinnamon is sufficient to yield 14 % calcium and 31 % iron of the daily requirements of an adult. Nevertheless, the requirements may vary slightly as per your calorie needs. It also contains high amounts of vitamin A and C along with minerals like Zn, K, Mg, and Mn. A 6.8 g serving provides 20 % vitamin A and 12 % vitamin C of the daily requirements of an adult.

**Keywords:** Coumarin; Cinnamaldehyde; Cinnamyl acetate; Cinnamyl alcohol;; LDL; Therapeutic applications



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## INTRODUCTION

Cinnamon is one of the oldest spices known. It was mentioned in the Bible and was used in ancient Egypt not only as a beverage flavoring and medicine, but also as an embalming agent. It was so highly treasured that it was considered more precious than gold. Around this time, cinnamon also received much attention in China, which is reflected in its mention in one of the earliest books on Chinese botanical medicine, dated around 2,700 B.C. Cinnamon's popularity continued throughout history. It became one of the most relied upon spices in Medieval Europe. Due to its demand, cinnamon became one of the first commodities traded regularly between the Near East and Europe. Ceylon cinnamon is produced in Sri Lanka, India, Madagascar, Brazil and the Caribbean, while cassia is mainly produced in China, Vietnam and Indonesia. Cinnamon is an aromatic and warm spice that is available in two forms - the cinnamon stick or ground cinnamon powder. The spice is actually obtained from the inner bark of the cinnamon tree. The bark is stripped from the tree and allowed to dry in the sun. Whilst drying, it rolls up into a quill and this is what we know as a cinnamon stick. Some of the quills are then ground down into a powder and this is what we know as ground cinnamon.

There are two main types of cinnamon that are used in cooking today, although around one hundred different types of cinnamon tree actually exist in the world.

True cinnamon (Ceylon cinnamon), which has a lighter, sweeter and more delicate flavour, is native to Sri Lanka where it's very popular in savoury dishes such as curries. It's also produced in India, the Caribbean and Brazil. We would use this sweet cinnamon in all types of cakes, biscuits, crumbles and breads. The other main type of cinnamon is obtained from the cassia tree, which is found in Southeast Asia in countries such as Indonesia, Burma, China and Vietnam. Cassia (Chinese cinnamon) is less expensive than the true cinnamon and perhaps spicier and more pungent. It's therefore preferred in exotic meat dishes, curries and other savoury foods. Cinnamon is one of the oldest spices around. It was mentioned in ancient Chinese writings of at least 2700 years old and also features several times in the Bible. The Egyptians imported cinnamon from China and used it not only as a medicine and food enhancer but also as an embalming agent. It was considered as precious as gold by many. For the Romans cinnamon was just as sacred and important. It was burned at funerals and it's said that the Emperor Nero burnt a whole year's supply at the funeral of his wife Poppaea. Cinnamon was one of the first spices to be traded between Asia and Europe and the fact that Venetian merchants controlled the entire cinnamon trade in Europe fuelled other European explorers to travel afar in search of other ways of obtaining the precious spice. After the Portuguese discovered Sri Lanka (Ceylon) at the end of the 15th century and took control of the cinnamon trade there,

the Dutch removed them from power a century later, followed by the British in 1796. Since then the importance of the cinnamon trade declined, as cinnamon began to be produced and cultivated in other areas.

Cinnamon or *cinnamomum verum* is an evergreen tree. The bark of the tree is commonly used and referred to as cinnamon. It's native to the Lauraceae family, in Sri Lanka. An increasing awareness towards the health benefits of cinnamon has spotlighted the spice across the globe. The name 'cinnamon' is Phoenician. The tree is popular for its distinct fragrance. The bark of the tree has always enjoyed an unparalleled demand due to its essential oil that is aromatic and great flavoring agent. The bark is either used in pieces or powdered, in a number of cuisines. The oil is extracted by pounding the bark, macerating it and finally distilling the essence. Cinnamon has a characteristic odor and a pungent taste. The taste and scent are the result of cinnamaldehyde aging in the presence of oxygen. The chemical components within cinnamon include eugenol, ethyl cinnamate, methyl chavicol, linalool, cinnamaldehyde and beta-caryophyllene. It's also referred to as 'karugapatta', 'pattai', 'lavanga pattai', 'kayu manis', 'cassia vera', 'kurundu', 'Korunda', 'tvak', 'dārusitā', 'dalchini' and 'qerfa'. The small tree thrives in India, Egypt, Sri Lanka, Brazil, Indonesia and Vietnam. It's an ancient spice, originally prepared by drying the bark of the tree and rolling it into sticks

or quills. Cassia cinnamon is darker and harder than Ceylon variety. The distinctive odor lies in the essence of cinnamic aldehyde or cinnamaldehyde that is concentrated in the bark of the tree. It has a pungent taste that comes from its composition of ethyl cinnamate, beta-caryophyllene, eugenol, methyl chavicol, cinnamaldehyde and linalool. Cinnamon bark is used around the world as a spice, condiment and for flavor. It can be consumed directly; the powder is used in a variety of soups and desserts across the globe. Cinnamon is associated with a number of health benefits. The volatile oil extracted from its bark is a trusted cure for a common colds and diarrhea. The extract is believed to be an antioxidant that also has antimicrobial properties, making the spice is a preferred preservative. Along with its inherent properties that help fight inflammation, the flavor appeals to all age groups. Cinnamon was probably the first spice used by man. Ancient records reveal that it was used for more than 5,000 years. The countless flavoring uses of this valuable spice need not be enumerated.



Cinnamon is widely believed to be high in anti-oxidants. Regular drinking of Cinnamon tea could be beneficial to oxidative stress related illness in humans. Cinnamon tea offers helpful relaxation for the stomach upset by the tension and strain of modern living. Who doesn't love a sprinkling of cinnamon on fresh apple pie or atop a chai latte? It's just one of those spices that tastes fantastic. But taste is not the only reason to love cinnamon. Numerous studies show that cinnamon **regulates blood sugar**, making it a great choice for diabetics and hypoglycemics alike. That's also great news for anyone who wants stable energy levels and moods. It **reduces LDL cholesterol levels**. LDL is also known as the harmful cholesterol. Reducing it may help reduce the risk of cardiovascular disease. It has natural anti-infectious compounds. In studies, cinnamon has been **effective against ulcer-causing H. pylori bacteria** and other pathogens. Vegan Cinnamon Rolls and Pastries. **It reduces pain linked to arthritis**. Cinnamon has been shown in studies at the Department of Internal Medicine, Kangnam Korean Hospital, to reduce cytokines linked to arthritic pain. Research at the University of Texas, published in the journal *Nutrition and Cancer*, shows that cinnamon **may reduce the proliferation of cancer cells**, holding promise for cancer prevention and sufferers of the disease. It's a **natural food preservative**. It's been proven **effective for menstrual pain and 9. infertility**.



Cinnamon contains a natural chemical called cinnamaldehyde, which studies show increases the hormone progesterone and decreases testosterone production in women, helping to balance hormones. Cinnamon holds promise for various neurodegenerative diseases, including: **Alzheimer's disease, Parkinson's disease, multiple sclerosis, brain tumor, and meningitis**, according to research at the Cytokine Research Laboratory, Department of Experimental Therapeutics, The University of Texas. Their research shows that cinnamon reduces chronic inflammation linked with these neurological disorders. Not a health benefit, but a great reason to love cinnamon, it's versatile. It **works with sweet and savory dishes** alike. Consider that many curries and savory Moroccan dishes include cinnamon. It's not just for apples anymore.

Source: Food Safety and Security Authority

#### VARIETIES OF CINNAMON

There are two popular kinds of Cinnamon, one is the "true Cinnamon" from the Cinnamon tree which is native in Sri Lanka (from the genus *Cinnamomum verum*) and the other is "Cassia" (*Cinnamomum Cassia*) which is being commercially cultivated in China, Indonesia, Vietnam and other Southeast Asian countries. It's widely accepted that Cinnamon from Sri Lanka is of better quality between the two. Cinnamon is used in many culinary receipts and desserts, such as donuts, apple pie, cinnamon buns as well as candies, tea, hot cocoa, and liquors. Cinnamon is also used in thick soups, drinks and sweets. Cinnamon is popularly used in the United States as flavoring for cereals, bread-based dishes and fruits. In Mexico, cinnamon is used in the preparation of chocolates. Other than for culinary purposes, oil obtained from the cinnamon bark is also popularly used in perfumery. Cinnamon oil is also used in dental and pharmaceutical products. Cinnamon leaf oil has been found to be effective in killing mosquito larvae. In some studies, Cinnamon leaf oil is being proposed for use as an insect repellent. Because Cinnamon has ancient origins, a broad range of folkloric health remedies have been practiced through the years that can be found in various cultures. But a number of scientific studies that were done confirmed that there are indeed some medicinal benefits from Cinnamon. Cinnamon has traditionally been used to

of India

treat toothache and fight bad breath. Cinnamon is also believed to stave off common colds, nausea, sued as general health tonic and as aid in digestion.

Cinnamon from Ceylon is quite different from the Cassia commonly sold in the United States. Our cinnamon is the original, sought after by the Romans, Marco Polo, and later European traders who finally found "the source" in Ceylon, now Sri Lanka. (*Zeylanicum* is the Latin word for Ceylon). Cinnamon *Zeylanicum*, also known as True Cinnamon, is native to Sri Lanka. By contrast, the majority of ground cinnamon currently sold in the United States is actually *Cinnamomum Cassia*. Cassia is cultivated in China and Indonesia from the aromatic bark of the Chinese cinnamon tree. The corky outer bark is not removed in the production of cassia, which is more pungent and robust than True cinnamon. It's not as delicate, sweet or subtle as the cinnamon produced in Sri Lanka. Cinnamon is antimicrobial and also restrains the growth of fungi and yeast, making it potentially useful in the treatment of allergies. Cinnamon also holds promises for people with diabetes, because it appears to stimulate insulin activity thereby helping the body to process sugar more efficiently. You see, that cinnamon roll may not only taste good, but be good for you, too! There has been recent studies on Cinnamon suggesting their usage for blood sugar control. It's suggested that Cinnamon helps you feel alert by possibly increasing blood

flow to the brain. Try adding Ceylon Cinnamon to the morning cup of coffee or tea. We have created a blend of spices for making Organic masala chai at home. This Masala Chai blend is made with ceylon cinnamon, cardamom pods, cloves, fennel seeds and malabar black peppercorns. Why go to big coffee shops to get masala chai?.

Taste: Real or True Cinnamon is sweet and delicate where as Cinnamon Cassia is strong to peppery

Color: Real Cinnamon is a tan color, whereas Cinnamon Cassia is a reddish brown to dark brown.

### **S COLOSSAL USES OF CINNAMON**

Cassia cinnamon is used as a home remedy to cure colds, nausea and diarrhea. Its variety is also believed to increase energy levels and blood circulation. Ayurveda remedies include cinnamon for the cure of diabetes, common cold and indigestion. The powder is used to make herbal tea. It lowers cholesterol that is bad and triglycerides or the fatty acids present in the blood. Research reveals that the spice is very effective in the marketed pill form, with each pill equivalent to 1 teaspoon of cinnamon powder. The pills have proven effective in reducing fasting blood glucose. It's believed to have antifungal and antibacterial properties and is used extensively in the cure of candida albicans fungus and helicobacter pylori bacteria. The

Look: Cinnamon Cassia bark is thicker because its outer layer isn't stripped off. For that reason, Cassia sticks curl inward from both sides toward the center as they dry. Real Cinnamon sticks curl from one side only and roll up like a newspaper as shown above.

Feel: The surface of Cinnamon Cassia is rough and uneven, whereas Real Ceylon Cinnamon bark is smooth.

Usage: Real Ceylon Cinnamon is perfect in sweet and subtle dishes that require a delicate flavor.



### **Cinnamon bark oil in a clear glass vial**

latter are primarily responsible for stomach ulcers. Cassia cinnamon naturally contains 'coumarin', a compound that has a blood-thinning effect. This helps as anti-clotting medication, for people with bleeding disorders. Concentrated cinnamon oil is used as an aromatherapy essential oil. The soothing effect and lingering aroma helps calm frayed nerves and relax.

The spice is also credited with anti-inflammatory properties. It's used to cure inflammation of internal tissues due to consumption of fried and processed foods. It's used in anti-inflammatory diets to reduce heart attacks, strokes, atherosclerosis and coronary diseases. This helps to keep heart disease at bay. It's rich in iron, manganese, calcium and fiber. The combination helps to reduce and eliminate bile, and subsequently prevents any damage to the colon cells or the onset of colon cancer. It also helps relieve ibs (irritable bowel syndrome). The latest claim highlights that merely smelling cinnamon acts as a memory booster. It's believed to improve memory and the performance levels for certain tasks.

The bark of the spice is used as a condiment. It's extensively used in the preparation of desserts such as chocolates and pies, as well as savory dishes of lamb and chicken. As an additive, it acts as an antioxidant and helps in the preservation of food. It has been traditionally used for ages to treat toothaches due to tooth decay and bad breath. Being a versatile spice, it can be put to a variety of uses. It's even chewed on directly, to help digestion. Freely available, the spice has a special place in every home and cuisine. Coupled with the various medicinal properties that It's credited with, cinnamon is a much sought after condiment, and for all the right purposes. Most of the cinnamon benefits are primarily derived from the three active compounds present in cinnamon: Cinnamaldehyde,

cinnamyl acetate and cinnamyl alcohol. These compounds are naturally present in the essential oils that are found in the bark of the cinnamon tree. The bark of cinnamon tree has been used for several medicinal as well as non medicinal purposes since long. It's believed to have strong antioxidant properties along with antibacterial and antifungal properties. You must be aware of the cinnamon oil health benefits, however, most people prefer to use the bark of cinnamon directly. This is because cinnamon oil often causes irritations and allergic reactions while cinnamon bark is considered safe for use.

#### **Some of the folkloric applications of Cinnamon are as follows**

**Memory Booster** , Cinnamon can improve cognitive function as well as memory.

**Blood Purification** . Cinnamon helps in removing impurities from the blood, and is often recommended for pimples.

**Promotes Healing** . Cinnamon helps to stop bleeding, and facilitates the healing process.

**Digestive Tonic** Cinnamon aids in digestion. Cinnamon is effective for indigestion, nausea, vomiting, upset stomach, diarrhea and flatulence. Cinnamon also relieves acidity and morning sickness.

**Respiratory problems** . Cinnamon helps in cold, flu, influenza, sore throat.

**Menstruation** . Cinnamon is effective in providing relief from menstrual cramp and discomfort..

**In Indian Ayurvedic medicine** , Cinnamon is used in the treatment of flatulence, piles, amenorrhea, diarrhea, toothache, amoebiasis, heart diseases, fever, cough, cold, headache and many others.

**Diuretic Effects** . Cinnamon is diuretic in nature and helps in secretion and discharge of urine.

**Aphrodisiac** and is believed to arouse sexual desire. It's also believed that cinnamon aids in the secretion of breast milk.

**Alzheimer Disease** . A team of Tel Aviv University scientists, headed by Prof. Michael Ovadia, isolate a substance in the cinnamon plant which inhibits development of Alzheimer in mice

**Tobacco Aid** , Cinnamon is also being recommended to help curb the urge for tobacco The National Institute of Health recommends chewing cinnamon sticks when trying to quit the use of tobacco

**Diabetes Type 2**, Cinnamon could have some pharmacological effects in the treatment of type 2 diabetes mellitus and insulin resistance. Recent studies in phytochemistry of Chinese Cinnamon have indicated that cinnamtannin B1 isolated from *C. Verum* bears possible therapeutic effect on type 2 diabetes.

**Infections**. Cinnamon has anti fungal, antibacterial, antiviral and antiseptic properties, It's effective on external as well as internal infections. It helps in destroying germs in the gall bladder and bacteria in staph infections.

**Cancer Prevention**. In a study published by researchers at the U.S. Department of Agriculture in Maryland, cinnamon reduced the growth of leukemia and lymphoma cancer cells.

**Colon Cancer** , Pharmacological experiments suggest that the cinnamon derived dietary factor cinnamic aldehyde (cinnamaldehyde) activates the Nrf2-dependent antioxidant response in human epithelial colon cells and may therefore represent an experimental chemopreventive dietary factor targeting colorectal carcinogenesis.



**Melanoma** , The cinnamon derived dietary factor cinnamic aldehyde also exhibits anti-melanoma activity observed in cell culture and a mouse model of human melanoma



### Cough and Cold

Cinnamon has been used as a home remedy for cough and common cold since ages. Have cinnamon tea twice a day and your cough or cold will disappear in no time. Adding little honey to ground cinnamon is just perfect to treat conditions like chronic cough, cold, sinus and even flue.

### Cinnamon to Control Diabetes

Cinnamon is believed to effectively help in the treatment of diabetes mellitus. The onslaught of the condition triggers the need for lifelong monitoring of blood sugar levels and the development of a health-centric routine. The success of the treatment plan lies in the effective control over environmental factors that add to the health malady. It relieves stress, increases metabolism and the body's immunity to fight disease. It improves insulin discharge to check blood glucose levels and reverses resistance to the hormone. The polyphenol type-A polymer present in the spice regulates cholesterol levels too. Advanced studies on its pharmacological effects reveal that cinnamon extract does have a therapeutic effect on diabetes. Phytochemistry research reveals that the spice relieves oxidative stress related to the development of Type 2 diabetes, while the significant antioxidant potential addresses organ damage. Though it does not appear to impact hemoglobin A1C levels in a major way, its involvement in diabetes treatment is mainly as a stress reliever and immunity

booster.

### Lowering Cholesterol

Studies show that cinnamon is capable of reducing the level of LDL cholesterol and triglycerides in the blood, thus helping to prevent a number of heart diseases. Just add a pinch of cinnamon to your food or use it as a mild sweetener for tea and coffee to enjoy its benefits.



### Cure in Arthritis

Cinnamon has anti-inflammatory properties that may help in reducing the pain and inflammation associated with arthritis. Mix cinnamon and honey to form a paste and massage it on the joints for relief from the

pain and discomfort.

### Immune Strength

Cinnamon helps in strengthening the immune system and protects us from a variety of bacterial and viral infections. It has anti fungal properties and may help in curing a lot of fungal infections too.

### Toothaches Relief

Cinnamon is one of the natural pain relievers for toothaches. Applying a paste made of one part cinnamon and four parts honey on an aching tooth will help in relieving the pain to a great extent.

### Skin Rejuvenator

The antibacterial and antifungal properties of cinnamon help in keeping the skin free of any infections. It has anti aging properties which protect the skin from the harmful effects of free radicals and makes the skin look healthier and younger. Adding cinnamon to the morning tea keeps your skin soft and fresh all the time!

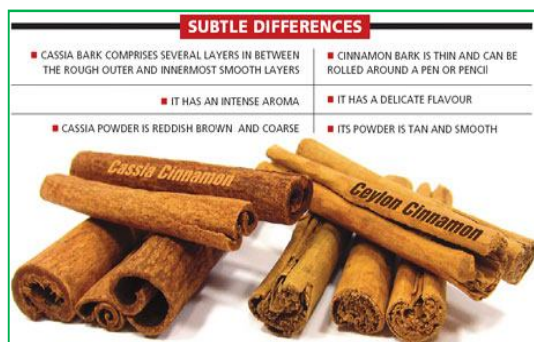
### No Hair loss

A lot of people suffer from the problem of hair loss. Cinnamon helps control hair loss and thus prevents balding. spice is derived from the barks of the bushy tree cinnamon, scientific name *Cinnamomum* species. While the Sri Lankan variety (*C. verum*) is considered a true one, there are two commercially important cinnamon species, namely Ceylon cinnamon (*C. zeylanicum*)

and Chinese cinnamon (*C. aromaticum*). Flavor wise they are almost similar, but the Ceylon type is sweeter and difficult to find in the market. The dried bark is sold as rolls, sticks, or quills, after the outermost rough portion is discarded. You can find grounded form of cinnamon as well.

**COUMARIN:** Coumarin is known to cause liver and kidney damage in high concentrations. True Ceylon cinnamon has negligible amounts of coumarin. FIRM (Federal Institute of Risk Management) in Germany advises people to stop using Cassia due to its medical impact on liver. Ceylon Cinnamon has between 2-5ppm of coumarin compared to Cassia (2000-5000ppm). Our Ceylon Cinnamon is tested at US lab for Coumarin content. Ceylon Cinnamon has between 0.001-0.005 milligram of Coumarin/ tea spoon. Cassia has at least 1000x more Coumarin than Ceylon Cinnamon. Coumarin is moderately toxic to the liver and kidneys. Although only somewhat dangerous to humans, coumarin is a potent rodenticide. German FDA has established a "TDI" (tolerable daily intake) of 0.1 mg coumarin/ kg body weight, but also advises, if this level is exceeded for a short time only, there is no threat to health. For example, a person weighing 60 kg (about 132 lbs) would have a TDI of ~ 6.0 mg of coumarin. German FDA has warned against consuming high amounts of cassia bark, one of the four species of cinnamon, because of its coumarin content. According to the German FDA, 1 kg of (cassia) cinnamon powder contains ~ 2.1 to 4.4 g of coumarin. Powdered Cassia Cinnamon

weighs 0.56 g/cc; therefore, 1 kg of Cassia Cinnamon powder is equal to 362.29 teaspoons (1000 g divided by 0.56 g/cc multiplied by 0.20288 tsp/cc). **This means 1 teaspoon of cassia cinnamon powder contains 5.8 to 12.1 mg of coumarin, which may be above the TDI for smaller individuals.** However, It's important to note that the German FDA has only cautions against high daily intakes of foods containing coumarin. Coumarin is often found in tobacco and artificial vanilla substitutes. Coumarin was banned as a food additive in the United States in 1954. Coumarin was banned as an adulterant in



cigarettes by tobacco companies in 1997. Coumarin is currently listed by FDA among "Substances Generally Prohibited From Direct Addition or Use as Human Food". All other varieties of Cinnamon, except Ceylon Cinnamon, have much higher coumarin content.

#### FAKE CINNAMON & ITS HAZARDS

Cinnamon is a must spice in an Indian kitchen, be it for preparing the famous Hyderabadi biryani and desserts or spicy curries. It's also an important ingredient in the Ayurvedic medicines. Apart from

lowering blood sugar levels, cinnamon can help reduce cholesterol levels significantly, fight nausea and prevent arthritis. However, what is primarily available in the Indian market in the name of cinnamon (*Cinnamomum zeylanicum*) is its alter ego—cassia or *Cinnamomum cassia*. This fake cinnamon contains a chemical, coumarin, which is used for making rat poison, according to the GFIRA (German Federal Institute of Risk Assessment). Coumarin can damage liver and kidneys in humans even if taken in relatively small doses. The daily tolerable intake of coumarin is 0.1 mg/kg of body weight and It's estimated that 1 kg of cassia powder contains 2.1 to 4.4 g of coumarin.

In September 2012, It's sued a note, advising people to stop using cassia. Traditionally both cinnamon and cassia have been used worldwide as spices and for manufacturing perfumes and cosmetics. But with studies showing health problems caused by cassia, several countries have imposed restrictions on its imports. So far, most European countries have banned the use of cassia in food items, while countries like the US, Germany and the UK import it only for making rodent poison. India, the world's leading spice producer, exporter and consumer, is yet to act against cassia despite several studies documenting its harmful effects. In 2010, the IITR (Indian Institute of Toxicology Research), Lucknow, found that coumarin can damage liver and kidneys. "Oil extracted from cassia leaf also contains 8 per cent of coumarin. It can

cause intestinal ulcer if consumed in large quantities," says M Ananaraj, director of the IISR (Indian Institute for Spices Research) in Kozhikode, Kerala. Cinnamon contains negligible amount (0.004%) of coumarin, he adds. Absence of regulatory mechanisms also means the poisonous alter ego of cinnamon continues to flood the Indian market. Though they do not look identical, they have similar smell and flavour due to the presence of chemical cinnamaldehyde. Consumers, and even retailers, unaware of the fraud get easily duped. "Most people do not know what a true cinnamon looks or smells like," says a spice grower from Cochin who does not wish to be named. "People prefer cassia as its smell and taste is sharper than cinnamon. P S S Thampi, deputy director (publicity) of Spices Board, says, the average production of cinnamon in India is 80 to 100 tons/ annum. This is miniscule compared to the annual demand of 12,000 tones. To meet this growing demand as well as for re-exporting cinnamon after value addition, India imports about 10,000 tones of cassia and 200 tones of cinnamon a year, says Thampi. Cassia is imported from China, Indonesia and Vietnam, while cinnamon is mostly imported from Sri Lanka as Ceylon cinnamon. In 2008 the Spice Board wrote to DGFT (Directorate General of Foreign Trade), asking it to list cassia as restricted item for import. "We have also informed the UMHFW (Union Ministry of Health and Family Welfare) for taking necessary action," says Thampi. FSSAI (Food Safety and Standards Authority of India) has

acknowledged that cinnamon and cassia are two different plants and classifies cassia an adulterant. Its website now mentions the difference between cassia and cinnamon. In 2011, it wrote to all food and health authorities to ensure that cassia is not sold as cinnamon. But the sale of cassia as cinnamon continues unabated.

### CONCLUSION

Cinnamon is probably best well known medicinally for two main reasons. First of all cinnamon is highly antiseptic. This due to the high content of phenol and means that cinnamon can be used as a very effective mouthwash. Secondly, as It's a warming spice, It's often very useful as a cold or flu remedy. Cinnamon soothes stomach and digestive complaints such as flatulence, indigestion, heartburn and stomach cramps. It's an excellent medicine for colds, congestion, temperature and flu. Research has shown that cinnamon is effective against fungus and yeast infections. Cinnamon can be used to lower fever by promoting seating. Cinnamon oil can be used to treat chest infections and catarrh. It can help improve blood circulation around the body especially to the hands and feet. Cinnamon is an aid for weak digestion. It can help reduce pain caused by arthritis, rheumatism and muscle pain. Cinnamon is a calming herb and can reduce anxiety, depression and stress. It can help with sickness, nausea and vomiting. Cinnamon can stimulate menstrual bleeding and help regulate periods. It has been proved to

lower high blood pressure. Chewing cinnamon sticks can relieve toothache and freshen the breath. Cinnamon is effective in the prevention of blood clots. Cinnamon has been proven to regulate blood sugar levels in people with type-2 diabetes and also to improve their response to insulin.

Therapeutically cinnamon has anti-diabetic, antioxidant, anti-clotting, anti-inflammatory, anesthetic, carminative, and rubefacient properties. However, its health benefits are mainly attributed to treating diabetic patients (especially those with insulin resistance or type 2 diabetes). The active ingredients (especially eugenol) help regulate blood sugar levels, thus reducing diabetes related complications. You will be glad to know that antioxidant activity of cinnamon is also is very high. Having antimicrobial properties, consuming dishes cooked with cinnamon is effective to fight bacterial and yeast infections. Other claimed benefits of cinnamon include improving memory, reducing arthritis pain (when taken with honey), treating flatulence, and combating medication-resistant yeast infections. According to studies conducted on cinnamon nutritional benefits, having half a teaspoon of cinnamon powder everyday will lower the bad cholesterol level. Researchers are on going to test its effectiveness in reducing proliferation of cancerous cells. Besides these therapeutic uses, cinnamon serves as a natural food preservative by increasing storage life of foods. As you are well acquainted with cinnamon

nutrition facts and health benefits, consider including it to ensure a good health and fight disease conditions. Nonetheless, remember that some side effects do exhibit in certain cases. Probable adverse reactions include skin irritation, stomach discomfort, and increased heart rate. It may also increase the action of diabetic, blood thinning, and antibiotic medications, hence people who are currently taking them should consult the doctor before ingesting cinnamon products. The essential oil of cinnamon also has antimicrobial properties, which can aid in the preservation of certain foods when added to food, it inhibits bacterial growth and food spoilage, making it a natural food preservative.

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