

1.0 INTRODUCTION.

Cassia is botanically-known as *Cinnamomum cassia blume*, *Cinnamomum burmannii*, *occidentalis*, *cassia tora*, *cassia obtusifolia* or *Cinnamomum cassia*, *Cinnamomum Cassia (nees) ex blume*, *Cinnamomum aromaticum (nees) syn*, *Cinnamomum burmannii (C.G.Nees) blume* and *Cinnamomum loureini nees*. Cassia is a member of the same family as Cinnamon referred to as "Chinese cinnamon", "Java cinnamon", "Padang cassia." or "Saigon cinnamon,". However cassia and cinnamon (dalchini) do not have in common is their coumarin content.

The term "cassia" never refers to *Ceylon cinnamon*. While most simply referred to as "cassia". Although related, cinnamon and cassia are not obtained from the same plant. They should be treated as separate foods, both from a nutritional and a health standpoint. Scientifically, there is only one true cinnamon, which is most commonly called "*Ceylon cinnamon*," and comes from the plant *Cinnamomum zeylanicum*. Cassia is often misnamed and mistaken as cinnamon and marketed to the consumers through retail outlets. Since the price of cassia is far below that of cinnamon, the traders misuse and encash the opportunity for their benefit by mis-declaration of the product.

1.1. Coumarin.

These are naturally occurring plant components present in cassia it is a chemical compound specifically from benzopyrene family. While the level of naturally occurring coumarins in Ceylon cinnamon appears to be very small and lower than the amount that could cause health risks, the level of naturally occurring coumarins in the *cassia* appears to be higher and may pose a risk to some individuals if consumed in substantial amounts on a regular basis. The chemical composition of cinnamon and cassia is different. In contrast to cassia, Ceylon cinnamon contains eugenol and benzyl-benzoate but no (at most traces) of coumarin. The coumarin level in the bark of cassia varies considerably. They depend considerably on respective sub- species or climatic conditions.

Food Safety and Standards (Food Product standards and Food Additives) Regulation, 2011 distinguish between cassia and cinnamon and prescribes standards for Cinnamon (Dalchini) which means the inner bark of trunks or branches of *Cinnamomum Zeylancium Blume*, Cassia (taj) which means the bark of trees of *Cinnamomum Cassia (nees) ex blume*, *Cinnamomum aromaticum (nees) syn*, *Cinnamomum burmannii*

(*C.G.Nees*) *blume* and *Cinnamum loureini nees*, where in the edible portion of the tree is bark. The standards have been laid in regulation 2.9.4 (1), 2.9.5 (1) of which can be referred on FSSAI official website www.fssai.gov.in.

2.0. Difference between Cinnamon (Dalchini) and Cassia (Taj).

Cassia varieties have a stronger, more intense and often hotter flavor than Ceylon cinnamon due to an increased percentage of cinnamaldehyde, up to 5-6% by weight. Cassia also has a significant amount of the blood-thinning phytochemical coumarin. Cinnamon and cassia sticks, however, have obvious visual markers which make them easy to identify:

Parameter	True Cinnamon	Cassia
Taste	Real or True Cinnamon is sweet and delicate	Cinnamon Cassia is strong to peppery
Colour	Real Cinnamon is a light brown/ tan color.	Cinnamon Cassia is a reddish brown to dark brown.
Look	Real Cinnamon sticks curl from one side only and roll up like a newspaper. Real cinnamon from Ceylon (<i>Cinnamomum zelanicum</i>) is filled like a cigar (Fig 1).	Cinnamon Cassia bark is thicker because its outer layer is stripped off. For that reason, Cassia sticks curl inward from both sides toward the center as they dry. Cassia has a hollow tube (Fig 1).
Feel	Real Ceylon Cinnamon bark is smooth.	The surface of Cassia is rough and uneven.
Grown in	India, Srilanka.	China, Vietnam, Indonesia.
Coumarin Content	low	High



Cinnamon



Cassia

Fig 1. Cinnamon and Cassia.

2.1. Test to differentiate between powdered cinnamon (*dalchini*) / cassia (*taj*).

It is difficult to tell powdered cinnamon from powdered cassia but: “When powdered bark is treated with tincture of iodine (a test for starch), little effect is visible in the case of pure cinnamon of good quality, but when cassia is present, a deep-blue tint is produced, the intensity of the coloration depending on the proportion of cassia”.

3.0. Ill effects of Cassia.

Coumarin is a chemical compound (specifically, a benzopyrone) found in many plants, particularly in cassia (*Cannamomum Cassia* (Nees) ex Blume. Coumarin is moderately toxic to the liver and kidneys, with an LD₅₀ of 275 mg/kg. They have strong anticoagulant properties because our blood needs to maintain its ability to coagulate in times of injury, excessive intake of coumarins over a prolonged period of time can pose health risks. According to the German Federal Institute for Risk Assessment, 1kg of Cassia powder contains approximately 2100 to 4400mg of coumarin. This means 1 teaspoon of cassia cinnamon powder contains 5.8 to 12.1 mg of coumarin. Species of Cassia like *Cassia occidentalis*, *cassia tora* or *cassia obtusifolia* are different from the cinnamon as their bark do not contain the flavouring compound, cinnamaldehyde and in fact these give obnoxious smell and have severe health effects. According to report repetitive and prolonged ingestion of a health drink made from herb of cassia genus resulted in severe hepatotoxicity in adults. Another study mentions, in human’s ingestions of *cassia occidentalis* can cause severe purging. Cassia toxicity cause syndrome of acute hepato-myo-encephalopathy. The German Federal Institute for Risk Assessment has established a tolerable daily intake of 0.1 mg coumarin per kg body weight. The exposure calculation revealed that in worst case scenario children who eat lot of cassia (cinnamon) clearly exceeded the TDI value for coumarin established by EFSA.

FAQ s.

1. What is coumarin and where does it occur?

Coumarin is a natural flavoring which is found in many plants. It occurs in higher concentrations in types of cinnamon grouped together under the name “cassia cinnamon”.

2. Why cinnamon is adulterated with cassia?

Cassia is usually cheaper in cost than cinnamon and hence is used for adulterating cinnamon. It is often mislabelled and sold as cinnamon.

3. How much coumarin does cinnamon contain?

A rough distinction can be made between two types of cinnamon. Ceylon cinnamon only contains low levels of coumarin which are safe. By contrast, cassia cinnamon contains high levels of coumarin and large amounts of this should not be consumed.

4. How can consumers distinguish between Ceylon cinnamon and cassia?

Consumers can distinguish between Ceylon cinnamon and cassia. In the case of cassia a relatively thick layer of the bark has been rolled into a stick however, the cross-section of a Ceylon cinnamon stick looks more like a cigarette – several thin layers of bark have been rolled up into a cinnamon stick resulting in a comparatively compact cross-section. The origin of the cinnamon is not normally declared on the packaging; sometimes false information has been supplied in the past. For more details please refer to section 2.0 difference between cassia and cinnamon of this document.

5. Can too much coumarin damage health?

It is common knowledge that relatively low doses of coumarin cause liver damage in a small group of particularly sensitive individuals if consumed over a few months. In minor cases this leads to an elevation of liver enzymes in blood, in severe cases to inflammation of the liver which manifests as jaundice. The exact mechanism of action is not known but the effects are reversible.

References:

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