

Original Research Article

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## Survey on the Commercial Utilization of Immature Cinnamon Fruit as Spice in Hilly Zone of Karnataka

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### A B S T R A C T

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Cinnamon (*Cinnamomum verum* L.), commonly known as *Dalchini*, is one of the ancient tree spices cultivated on commercial scale in India. Both bark and leaves of this plant are aromatic due to the presence of volatile constituents- cinnamaldehyde and eugenol, apart from numerous other chemicals. A survey was conducted to know the effect of immature fruits of cinnamon with different locations and farmers with respect to yield and commercial utilization of cinnamon fruits. Cinnamon growers from Sirsi and Siddapurtalukas of malnad Karnataka were selected for the survey during 2019-2020. Information collected as per the survey format on Stage of fruit harvest varied from Immature buds (SujayBhat) to Just exposure of fruit from perianth (Dinesh Gowda) and Immature fruit just tip opens (SatishDev). Fruit yield per tree ranged between fresh (6 kg), dry (2.4 kg) [Dinesh Gowda] to fresh (4 kg), dry (1.6 kg) [SatishDev] and fresh (3 kg), dry (1.2 kg) [SujayBhat] and Number of fruits per kg weight ranged between (10500 fruits/kg) Dinesh Gowda to (10300 fruits/kg) SatishDev and (10100 fruits/kg) SujayBhat etc. From this study, it was concluded that cultivating mono crop over mixed crop gives better yield of Cinnamon fruits [Dinesh Gowda] fresh (6 kg), dry (2.4 kg) followed by [SatishDev] fresh (4 kg), dry (1.6 kg) [SujayBhat] fresh (3 kg), dry (1.2 kg) respectively.

### Introduction

Cinnamon (*Cinnamomum verum* L.), commonly known as *Dalchini*, is one of the

ancient tree spices cultivated on commercial scale in India. Both bark and leaves of this plant are aromatic due to the presence of volatile constituents- cinnamaldehyde and

eugenol, apart from numerous other chemicals. Many Indian cuisines are incomplete without cinnamon and it is commonly used in the form of bark pieces, bark powder and essential oil (Krishnamoorthy *et al.*, 1998). Cinnamon immature fruits are used whole or ground, like black pepper corns, Whole cinnamon buds are used in pickling recipes, stews and brines for meat or poultry. They are used to flavour curries and spicy meat dishes in India. Ground cinnamon immature fruits are often used in powdered masala mixes and are particularly used in different regional recipes like Parsidhansakh, Malvani and Maharashtrian powdered masala. They can be used as substitute for cinnamon bark. The whole buds can be used in place of cloves for making spiced orange pomanders can be stored for the holidays or used in mulling spice blends and teas. Cinnamon buds in an airtight container for up to one year ([https://specialtyproduce.com/produce/Cinnamon Tree Berries 15608.php](https://specialtyproduce.com/produce/Cinnamon%20Tree%20Berries%2015608.php)). In the past, immature fruits of *Cinnamomum alabatum* were traded in place of cassia buds, both as a substitute and as an adulterant. It was used in panas a substitute for clove buds. Pan chewing is habit among many people in South Asia – the basic ingredient of panquid consists of betel leaves (*Piper betel* L.), areca fruit (*Areca catechu* L.) lime and clove bud for flavor, with or without tobacco. Local practitioners of Ayurveda use the dry, young fruit as 'Nagakesar' (in place of the dried buds of *Mesua ferrea*, used in other parts of the country). The bark is extracted, dried, powdered and used as a base material in the manufacturing of incense sticks (Ravindra *et al.*, 2004). It is observed that immature cinnamon fruits are also used as spice in malnad taluks of Uttar Kannada district. It is also produced by farmers on limited scale and marketed. Hence the present investigations were taken.

## Materials and Methods

Experiment was conducted in an open condition of the Department of Plantation, Spices, Medicinal and Aromatic crops College of Horticulture, Sirsi, during 2019-2020. Sirsi is situated in the Western Ghats, represents the typical climate of Hill zone (Zone- 9) of Karnataka. It is located at  $14^{\circ}37'$  North latitude and  $74^{\circ}85'$  East longitude with an altitude of 616 m above mean sea level (MSL). The experiment was conducted in a farmer's field (Table 1).

## Results and Discussion

Cinnamon growers from Sirsi and Siddapur talukas of malnad Karnataka were selected for the survey during 2019-2020. Information was gathered by using pre tested interview schedule. On stage of fruit harvest, fruit yield per tree and number of fruits per kg weight etc. (Table 2).

Stage of fruit harvest varied from Immature buds (SujayBhat) to Just exposure of fruit from perianth (Dinesh Gowda) and Immature fruit just tip opens (SatishDev). Information on both fresh and dry fruit yield per tree was collected during 2019-20 and expressed as yield per tree. Fruits yield per tree ranged between fresh (6 kg), dry (2.4 kg) [Dinesh Gowda] to fresh (4 kg), dry (1.6 kg) [SatishDev] and fresh (3 kg), dry (1.2 kg) [SujayBhat]. Number of dry fruits per kg ranged between (10500 fruits/kg) Dinesh Gowda to (10300 fruits/kg) SatishDev and (10100 fruits/kg) Sujay Bhat.

Immature cinnamon fruit commonly referred as bud or Cassia bud is an item of commerce and consists of dried immature fruits of *C. cassia*. It varies in length from 6 to 14 mm and the width varying from 4 to 6 mm. The immature fruit is enclosed with a calyx cup (Ravindra *et al.*, 2004). Perry (1969) has

provided a detailed description of the histology of the cassia bud.

**Cinnamon buds:** Cinnamon bud is an item of commerce and consists of dried immature fruits of *C. cassia*. They vary from about 6 to 14 mm in length, the width of the cup varying from about 4-6 mm. The immature fruit is enclosed with in the calyx cup. Dried cassia buds have a sweet, warm, pungent taste similar to that of cassia bark. Perry (1969) has provided a detailed description of the histology of the cassia bud, on which the following discussion is based. The calyx lobes consists of a) an outer epidermis of small cells, rectangular or nearly so, with thick outer walls; b) a cortex of parenchyma cells, secretion cells and occasional stone cells; and c) fibro-vascular tissue consisting of short and long parenchyma. The short fibres are porous with numerous pits. The long fibres are pitted and striated. Phloem cells are numerous. Xylem vessels are small and consist of annular, spiral and reticulate types. There is an inner epidermis of small, rectangular cells, similar to that of the outer epidermis. **Calyx tube:** The calyx tube consists of the following parts: i) an epidermis of small cells, rectangular or nearly so, with thick outer walls; ii) a cortex of parenchyma cells, isodiametric that are about 45 inch diameter, secretion cells about 66 inch diameter; and occasional stone cells. The cell contents are light to dark brown in colour; iii) a pericycle marked by a ring of fibres, the ring is broken

by the parenchymatous tissue of pith rays. The fibres are thick-walled and up to about 66 inch diameter; iv) fibrovascular tissue similar to that of the calyx lobes; and v) pith of isodiametric, parenchymatous cells and occasional stone cells.

**Cinnamon –** In medicine Dried bark and twigs of cassia are not only important as spices but are also used as an important crude drug in oriental medicine (Ravindra et al., 2004). Medicinal use of cinnamon was first mentioned by Tao Hunkin (AD 451-536). The therapeutic effect is regarded as being due to tannins present in its bark (Yazaki and Okuda, 1990). Tannins of cassia were recorded to have both antiviral and cytotoxic activity. Dried stem bark of cassia is used to treat inflammation, headaches and pyrexia (Kankari et al., 1989), diarrhea, nausea and flatulence and as a tonic. In Yemenite folk medicine, cassia is an ingredient of the compounds used against headache and melancholy (Aslokar et al., 1994). It is also used in the traditional medicines of Tibet and folk medicine in Mongolia and the Trans-Baikal region. Cinnamon also forms one of the components of Japanese herbal medicines such as “TJ 960”, which is recommended for hippocamal neuron damage. Chinese herbal medicine formulations contain the bark of cassia and are used to treat blood hyperviscosity, hyperlipemia, hypercoagulability.

**Table.1** Details of source and features of cinnamon genotypes planted in College farm of College of Horticulture, Sirsi

Sl. No.	Genotype	Source of collection	Description / Morphological features of cinnamon genotypes*
1	COHS-C-3	Plants raised from mother tree of college farm, Sirsi.	Leaf colour: Moderate yellow green. Shape: Elliptic Texture: Glabrous, Size: Small,

			Veniation: Triplinerved from base. Arrangement: Opposite.
2	COHS-C-4	Deepak nursery, Kadekodi, Tq. Kumta.	Leaf colour: Strong yellow green. Shape: Elliptic Texture: Sparsely hairy, Size: Large, Veniation: Triplinerved from base. Arrangement: Opposite.
3	COHS-C-5	Directorate of Cashew Research (DCR), Puttur. (DK)	Leaf colour: Moderate yellow green. Shape: Acuminate Texture: Sparsely hairy, Size: Medium, Veniation: Triplinerved from base. Arrangement: Opposite.
4	COHS-C-6 (KonkanTej)	KKV, RFRS, Vengurle, Dist: Sindadurga, Maharashtra.	Leaf colour: Greyish olive green. Shape: Ovate Texture: Sparsely hairy, Size: Small, Veniation: Triplinerved. Arrangement: Opposite.
5	COHS-C-7	HRES, Terakanahalli, Sirsi (Original source from RHREC, Bengaluru).	Leaf colour: Moderate olive green. Shape: Elliptic Texture: Sparsely hairy, Size: Medium, Veniation: Triplinerved from base. Arrangement: Opposite.
6	COHS-C-8	Ayush Mavinakoppa Tq. Sirsi (Mr. Gudigar)	Leaf colour: Greyish olive green. Shape: Obtuse Texture: Sparsely hairy, Size: Small, Veniation: Triplinerved from base. Arrangement: Sub-opposite.
7	COHS-C-9	Forest Research Nursery, Terakanahalli, Tq: Sirsi (From mother tree available in the Research Nursery)	Leaf colour: Deep greenish yellow. Shape: Lanceolate-oblong Texture: Glabrous, Size: Large, Veniation: Triplinerved from base. Arrangement: Sub-opposite
8	COHS-C-10	Collection from Kursevillage .Tq: Sirsi.	Leaf colour: Moderate yellow green. Shape: Acute Texture: Glabrous, Size: Large, Veniation: Triplinerved from base. Arrangement: Opposite.

9	COHS-C-11	Ramnath Hegde, Hunasekoppa, Kansur, Tq: Siddapur.	Leaf colour: Moderate olive green. Shape: Lanceolate-elliptic Texture: Glabrous, Size: Large, Veniation: Triplinerved from base. Arrangement: Sub-opposite.
10	COHS-C-12	Annapurna nursery, Pethri, Post: Cherkady, Tq: Udupi Dist: Udupi	Leaf colour: Moderate olive green. Shape: Obtuse Texture: Glabrous, Size: Medium, Veniation: Triplinerved from base. Arrangement: Opposite.
11	COHS-C-13	KAU, Central nursery, Kerala of Sigandini (Seedling progeny)	Leaf colour: Strong yellow green. Shape: Lanceolate-oblong Texture: Sparsely hairy, Size: Large, Veniation: Triplinerved. Arrangement: Sub-opposite.
12	COHS-C-14	Mother tree from IISR, Bulk seedlings.	Leaf colour: Moderate yellow green. Shape: Lanceolate-oblong Texture: Glabrous, Size: Medium, Veniation: Triplinerved. Arrangement: Sub-opposite.
13	COHS-C-15	From KAU, Thrissur (From the Department of SPC/PMA)	Leaf colour: Moderate yellow green. Shape: Elliptic Texture: Glabrous, Size: Medium, Veniation: Triplinerved from base. Arrangement: Opposite.
14	COHS-C-16	Dept. of Horticulture, UAS, Dharwad.	Leaf colour: Light olive. Shape: Lanceolate-elliptic Texture: Glabrous, Size: Large, Veniation: Triplinerved. Arrangement: Sub-opposite.
15	COHS-C-17	Kedar nursery, Malagi, Tq: Mundgod (Nagaraj Hegde)	Leaf colour: Strong yellow green. Shape: Lanceolate Texture: Glabrous, Size: Large, Veniation: Triplinerved. Arrangement: Opposite.

**Table.2** Information on production of immature fruits for utilization as spice in cinnamon

Farmer No.	Name of the farmer and GPS Location	Season of harvest (Month)	Stage of harvest	Yield per tree		Number of dry fruits per kg
				Fresh (Kg)	Dry (Kg)	
1	Dinesh Gowda Village: Kunaji, Tq: Siddapura, Dist: Uttara Kannada, GPS Location, Altitude: 550 MSL. Longitude: $14^{\circ}38'15.3''N$ . Latitude: $74^{\circ}52'42.8''E$ .	March	Fruit just before exposure from perianth	4	2.4	10476
2	SatishDev Village: Belale near Bairumbe Tq: Sirsi, Dist: Uttara Kannada, GPS Location, Altitude: 568 MSL. Longitude: $14^{\circ}42'51.9''N$ . Latitude: $74^{\circ}50'48.3''E$ .	February -March	Immature fruit just tip opens	4	1.6	10259
3	SujayBhat Village: Hosalli, Tq: Sirsi, Dist: Uttara Kannada, GPS Location, Altitude: 576 MSL. Longitude: $14^{\circ}42'46.2''N$ . Latitude: $74^{\circ}40'30.2''E$ .	May	Immature fruits	3	1.2	10067

In the past, immature fruits of this species were traded in place of cassia buds, both as a substitute and as an adulterant.

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the dry, young fruit as ‘Nagakesar’ (in place of the dried buds of *Mesua ferrea*, used in other parts of the country). The bark is extracted, dried powdered and used as a base material in the manufacturing of incense sticks (agarbathi) (Ravindra *et al.*, 2004). The leaves are used in households.

Cinnamon buds (Kuitsz) are the dried immature fruits, which includes calyx and often pedicel. Cinnamon buds are harvested

from trees left uncut in plantations or from wild trees during October – November, and are then dried in the sun or shade. Leaves for distillation are collected from cut shoots and from prunings of excess foliage from standing trees. The main harvest season is June – July, when the oil yield is highest. Large mature leaves are said to yield the best quality oil (Weiss, 1977). Often small twigs and branchlets are also mixed with leaves for distillation. Harvested leaves are allowed to partially dry before distilling.

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