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Evaluation of selected Chinese cassia (*Cinnamomum cassia* Blume) accessions for chemical quality

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Abstract

Twenty five Chinese cassia (*Cinnamomum cassia)* accessions were analysed at 15% moisture level for bark oil, bark oleoresin and leaf oil percentages. Bark oil ranged from 1.2 to 4.9%, leaf oil 0.4 to 1.6% and bark oleoresin 6.0 to 10.5%. Cinnamaldehyde was the major constituent in both leaf and bark oils. Accessions A_1 and C_1 had high bark oleoresin and D_1, D_3 and D_5 high bark oil and cinnamaldehyde contents.

Key words : *Cinnamomum cassia,* Chinese cassia, evaluation, selection, quality.

Chinese cassia (*Cinnamomum cassia* Blume) (Syn. *C. aromaticum* Nees) is one of the oldest known spice cultivated to a large extent in China. The bark of the tree is used for flavouring food and beverages and also in pharmaceutical preparations and perfumery. The bark of *C. cassia* is coarser and thicker with more intense aroma than true cinnamon (*C. verum* Bercht. & Presl.). The volatile oil from leaf and bark and the oleoresin from bark are used in soaps, perfumes, spice essences and beverages. While the major constituent of cinnamon bark oil is cinnamaldehyde and leaf oil is eugenol, both bark and leaf oils of *C. cassia* have cinnamaldehyde as the major chemical constitutent. While the precentage of cinnamaldehyde in the cinnamon bark oil is 60-65, that of cassia bark and leaf oil is 70-80 (Purseglove 1981). Consumers in India generally prefer the pungent cassia bark over *C. verum* which is imported to meet the demand. Very few trees of *C. cassia* (introduced) are available in India. Exploiting the available variability in Chinese cassia assumes great significance in this context. This study deals with evaluation of chemical quality of 25 Chinese cassia lines for leaf oil, bark oil, bark oleoresin and cinnamaldehyde content of the oils.

Open pollinated seedling progenies of 26 Chinese accessions (20 years old) collected from Sree Kundara Estate, Valparai (Tamil Nadu, India) were planted at the Experimental Farm of Indian Institute of Spices Research at Peruvannamuzhi (Kerala, India) at 2 m x 2 m spacing with all regular cultural practices. The first coppicing and bark extraction was done 3 years after planting and subsequent extractions were

carried out the following year during July and September. The extracted bark was shade dried for 24 h and sun dried for 36 h. Dried bark at 15% moisture level was used for extracting oil and oleoresin. Leaves were collected at random from each accession, shade dried for 4-5 days and used for extracting oil.

Table 1. Evaluation of Chinese cassia accessions for quality

Acc. No.	Bark			Leaf	
	Oil	Oleoresin	Cinnamaldehyde	Oil	Cinnamaldehyde
	%	%	%	%	%
A_1	3.75	10.20	81.50	1.00	80.50
A_2	2.95	8.30	88.00	0.61	57.00
A_6	2.80	9.75	61.50	1.60	71.00
A_7	2.70	9.80	70.50	1.00	55.00
B_1	2.80	7.55	78.50	1.10	80.60
B_2	2.65	6.00	81.00	0.60	71.60
B_3	1.20	8.75	70.00	0.65	60.00
B_4	2.80	9.00	80.50	1.10	67.40
B_5	3.75	7.70	71.50	1.35	58.00
B_6	3.85	8.30	76.50	0.80	66.50
C_1	3.45	10.50	86.50	0.50	76.50
C_2	3.35	6.00	72.00	0.80	65.00
C_3	2.25	7.90	73.50	1.45	73.00
C_4	3.50	7.70	71.00	1.45	86.00
C_5	3.35	7.50	66.50	1.45	70.50
C_6	3.10	9.35	68.00	1.35	71.50
C_7	2.90	7.45	87.50	1.35	60.00
C_8	3.25	7.15	87.00	1.05	62.20
D_1	4.70	9.30	86.50	0.95	76.00
D_2	2.70	9.70	91.00	1.25	40.70
D_3	4.90	8.65	90.50	1.15	75.00
D_4	2.45	8.10	62.00	0.04	71.50
D_5	4.25	7.00	85.50	1.45	58.00
D_6	2.55	9.20	79.50	1.40	53.50
D_7	1.30	9.15	64.00	0.82	77.50
Mean±SE	3.09±0.59	8.40±1.13	77.22±6.31	1.08±0.21	67.38±6.94
Range	1.2 to 4.9	6.0 to 10.5	61.5 to 91.0	0.4 to 1.6	40.7 to 86.0
CV%	26.79	18.98	11.55	26.74	14.57
CD (P=0.05)	1.71	3.29	18.42	0.60	20.26

Essential oil was extracted from powdered leaf and bark by hydrodistillation using Cleavenger trap (lighter than water type) (ASTA 1968). Cinnamaldehyde from leaf oil and bark oil was estimated by gas chromatography using FID and Carbowax (20 M) column. The oven temperaure was programmed from 70-210°C @ 8°C/min. The bark oleoresin was estimated gravimetrically from the powdered bark by cold percolation using acetone (ASTA 1968).

The bark oil in various accessions ranged from 1.2 to 4.9%, leaf oil 0.4 to 1.6% and bark oleoresin 6.0% to 10.5%. The cinnamaldehyde content of leaf oil ranged from 40 to 86% and that of bark oil 61 to 91%. The coefficient of variation was high for bark and leaf oil (26.79 and 26.74%, respectively) whereas it was comparatively low for bark oleoresin (18.98%) and cinnamaldehyde contents (11.55%) (Table 1). Even though the parent trees were from a high altitude like Valparai (1000 m above MSL), the performance of these accessions was relatively good in the plains like Peruvannamuzhi (30 m above MSL). Though variability with regard to leaf oil and bark oil was high, the pungency and flavour of the accessions were more or less uniform as indicated by the low CV in cinnamaldehyde content. Lewis (1984) reported that *C. cassia* does not generally posses eugenol and it has only isoeugenol or methyl eugenol. Accesions like A_2, B_4 etc. had high isoeugenol content (12% and 9%, respectively). Half of the accessions had more than 3% bark oil and more than half had more than 8% bark oleoresin indicating that majority of the lines are highly promising. A_1 and C_1 had high bark oleoresin and D_1, D_3 and D_5 had high bark oil and cinnamalehyde contents. Considering the chemical and flavour profile, C_1, D_1 and D_3 were selected for further multiplication and evaluation.

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