ARTICLE

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QUALITY EVALUATION OF BLACK PEPPER CULTIVARS*

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Over 70 cultivars of black pepper *(piper nigrum L.)* are being grown in India[1], but except for a few like Karimunda, Panniyur-I and Kottanadan, others have only of localised distribution. These cultivars differ in their yield characteristics such as total number and length of spikes, number and size of berries and drying percentage.

In recent years, a number of processing factories to extract pepper oil and oleoresin have been set up and export of pepper products like pepper oil and pepper oleoresin are on the increase. In view of the above mentioned factors, it has become necessary to select pepper cultivars not only for their yield of pepper berries, but also for their quality. The quality components in pepper are aroma, contributed by essential oil, and pungency, due mainly to piperine [2,3] In an earlier study, Lewis et al.[3] reported the quality characters of eight cultivars of black pepper. Recently the CPCRI Regional Station has taken up a systematic evaluation of pepper cultivars for yield, quality and tolerance to diseases and pests. The quality components of 29 cultivars of black pepper are reported in this paper.

MATERIALS AND METHODS

Spikes of uniform maturity were harvested from the cultivars, berries separated, sun dried, and powdered for analysis. Essential oil was estimated by steam distillation using a clevenger trap of lighter than water ty. e for collecting oil. Oleoresin was extracted with 1, 2 dichlorethane and the solvent was later removed by distillation under reduced pressure and finally by keeping the oleoresin at 110°C to constant weight. Starch was determined by the anthone method[4], and peperine spectrophotometrically[5] using a Beckman UV Spectrophotometer. All estimations were done in duplicate and the mean values are presented here.

RESULTS AND DISCUSSION

Percentages of volatile oil, oleoresin, piperine and starch in the berries of 29 cultivars are given in Table-1.

The essential oil content for most of the cultivars lies between 3 and 5% (v/w). The cultivars Kalluvally (Pattambi) has exceptionally low oil content (0.4%), while Nilgiris has the highest oil content (5.50%).

The oleoresin content ranged from 5.45 to 17.80 w/w, with most of the cultivars falling between 9 and 11%. Piperine content ranged from 2.85% (w/w) in Doddigya to 7.60 in Kumbhakodi and Ceylon. Most of the cultivars had 3-5% piperine.

Starch content ranged from 12.42% (w/w) in Kaniakkadan to 46.62% in Chumala. With most of the cultivars falling in the range 20 and 35% (w/w). The analysis of the data has indicated a negative correlation between starch and piperine contents, which is significant at 5% level. However, this may need further confirmation based on analysis of more samples from different sources.

Though the amount of oleoresin and piperine are measures of the quality standards of a cultivar, their yield on a per hectare basis must also be taken into consideration when assessing the overall superiority. Projected yield of oleoresin and piperine per hectare were calculated based on raw berry yield, drying percentage and assuming a population of 1100 plants per hectare. Table-2 shows the results of these calculations. Panniyur-I ranks first with a yield of 244.53 Kg oleoresin and 92.66 Kg piperine per hectare The other cultivars with high yield of oleoresin and piperine per hectare are Kalluvally, Nilgiris and Cheriyakaniakkadan. Some of the popular cultivars could not be included in the calculation of projected yield of oleoresin and piperine, due to non-availability of data on yield of berries and drying percentage. The projected yield data have been furnished only to indicate the probable extent of variability among the cultivars for their quality characteristics.

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Table-1 Quality composition of 29 pepper cultivars (Values on dry weight basis)

No.	Cultivar	Volatile Oil % v/w	Oleoresin % w/w	Piperine % w/w	Starch % w/w
1.	ARIKOTTANADAN	4.75	12.90	4.50	24.66
2.	ARAKKULAM MUNDA	4.75	9.84	4.40	36.18
3.	BALANKOTTA	5.12	9.35	4.26	25.20
4.	CEYLON	3.75	13.50	7.60	15.66
5.	CHERIYAKANIAKKADAN	3.75	9.05	3.95	24.84
6.	CHUMALA	2.25	5.45	3.30	46.62
7.	DODDIGYA	2.50	7.10	2.85	36.00
8.	KALLUVALLY	3.25	8.80	4.24	31.50
9.	KALLUVALLY (PTB)	0.40	10.90	4.65	29.00
10.	KALLUVALLY TYPE I	3.00	8.44	5.40	20.70
11.	KANIAKKADAN	4.75	11.60	6.00	12.42
12.	KOTTANADAN	2.50	17.80	6.60	23.40
13.	KARIMUNDA	4.00	11.00	4.40	39.60
14.	KARUVILANCHY	3.50	9.70	4.30	27.00
15.	KUMBHAKODI	4.50	14.90	7.60	18.20
16.	KUTHIRAVALLY	4.50	14.90	5.97	14.04
17.	MUNDA	4.75	7.00	5.60	22.70
18.	MUNDI	3.50	7.50	3.60	23.40
19.	NARAYAKODI	4.00	10.85	5.40	24.50
20.	NILGIRIS	5.50	15.50	6.05	23.60
21.	PALULAUTA	3.00	7.60	3.60	19.26
22.	PANNIYUR-I	3.50	9.52	3.60	35.10
23.	PERUMKODI	3.00	8.60	4.00	28.80
24.	PERUMUNDA	4.00	8.00	7.40	26.64
25.	SHIMOGA	2.50	7.20	4.56	17.64
26.	SULLIA	4.00	6.80	3.60	20.70
27.	TMB II	2.50	10.80	5.80	32.60
28.	UTHIRANKOTTA	4.75	8.55	3.92	28.80
29.	VALLY	2.50	6.53	4.90	16.02

Table-2: Projected yield of oleoresin and piperine per hectare*

Cultivar	Pepper berries			Oleoresin			Piperine	
	Fresh wt/vine (Kg)	Drying%	Dry wt/vine (Kg)	Dry wt/ha (Kg)	%	Yield/ha	%	Yield/ha
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
ARIKOTTANADAN	1.68	37.5	0.630	693.00	12.90	89.40	4.50	31.18
CHERIYAKANIAKKADAN	3.98	30.0	1.190	1309.00	9.05	118.50	3.95	51.71
CHUMALA	0.95	33.3	0.320	352.00	5.45	19.20	3.30	11.62
DODDIGYA	0.08	30.0	0.024	26.40	7.10	1.90	2.85	0.75
KALLUVALLY TYPE I	3.92	37.5	1.470	1617.00	8.44	136.50	5.40	87.32
-do- (PTB)	2.79	35.0	0.980	1078.00	10.90	117.50	4.65	50.12
KANIAKKADAN	0.42	30.0	0.130	143.00	11.60	16.60	6.00	8.58
KARIMUNDA	1.74	35.0	0.610	671.00	11.00	73.81	4.40	29.52
KARIVILANCHY	1.35	35.7	0.480	528.00	9.70	51.22	4.30	22.70
KOTTANADAN	0.93	37.5	0.349	383.90	17.80	68.33	6.60	25.34
KUTHIRAVALLY	1.35	35.7	0.480	528.00	14.90	78.70	5.97	31.52
KUMBHAKODI	0.44	26.6	0.120	132.00	14.90	19.70	7.60	10.03
MUNDA	0.17	34.0	0.058	63.80	7.00	4.50	5.60	3.57
MUNDI	0.09	33.3	0.030	33.00	7.50	2.48	3.60	1.19
NARAYAKODI	1.20	37.5	0.450	495.00	10.85	53.71	5.40	26.73
NILGIRIS	2.30	30.0	0.690	759.00	15.50	117.65	6.05	45.92
PALULAUTA	0.36	30.4	0.110	121.00	7.60	9.20	3.60	4.36
PANNIYUR-I	6.42	36.4	2.340	2574.00	9.50	244.53	3.60	92.66
PERUMKODI	1.11	33.3	0.370	407.00	8.60	35.00	4.00	16.28
PERUMUNDA	1.43	27.5	0.390	429.00	8.00	34.32	7.40	31.75
SHIMOGA	0.13	40.0	0.050	55.00	7.20	4.00	4.56	2.51
SULLIA	0.97	32.5	0.310	341.00	6.80	23.20	3.60	12.28
UTHIRANKOTTA	0.32	42.8	0.140	154.00	8.60	13.24	3.92	6.04
VALLY	1.09	30.0	0.330	363.00	6.53	23.70	4.90	17.80

*Yield data from Annual Report, AICSCIP, 1975-76, CPCRI, Kasargod. Reported from Central Pepper Research Station, Panniyur.