

DRYING CHARACTERISTICS OF DIFFERENT CORIANDER (*CORIANDRUM SATIVUM* L.) VARIETIES

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ABSTRACT

A lab experiment was conducted to know the effect of drying on colour and sensory characteristics of different varieties of coriander herbage during 2012-13 at department of plantation, spices, medicinal and aromatic crops, Kittur Rani Channamma College of Horticulture, Arabhavi (Karnataka). The experiment was laid out in completely randomized design with three replications and thirteen treatments. Studies on the drying characteristics of different coriander varieties revealed that the maximum drying ratio and rehydration ratio were recorded in RCr-480 (5.42) & DWD-3 (4.23) respectively. The variety RCr-446 was only towards the lightness (58.07). The mean values of L^* decreased from fresh herbage (40.09) to dried herbage (36.67). The mean values for redness (a^*) decreased from (-7.57) to (-2.26). The b^* value was towards the yellowness for both fresh and dried herbage. The highest score for flavor and aroma was observed in DWD-3 (7.97) and highest score for colour (8.00) and overall acceptability (7.77) was observed in RCr-435.

INTRODUCTION

Green leafy coriander herb is an abundant source of minerals and vitamins and adds colour, flavour and aroma to the daily diet. In India fresh coriander is available from December to March. Coriander green foliage is highly perishable in nature and has short shelf life. In summer months the availability of coriander foliage is scarce. When there is a glut in the market the herbage is wasted due to lack of proper post harvest handling and preservation techniques. The fresh green coriander (herbage) if properly dried, packed and stored may help in increasing its availability during lean periods at a lower price (Preetinder *et al.*, 2006).

Drying is one of the oldest method of preservation of foods. In addition to increasing variety in the diet, dried products create easy transportation, possibility of storage at ambient conditions and occupying less storage space. Further, dehydrated produce can be rehydrated before use to near fresh quality.

Dehydration is the process of removing water from a product under controlled conditions of airflow, temperature and humidity, which reduces the moisture in the food to such a low level that inhibits the microbial growth leading to decay and spoilage.

Ahmed *et al.* (2001) studied the drying characteristics and product quality of coriander leaves. Rehydration capacity was found to be maximum when the blanched leaves were dried at 45°C. Agasimani *et al.* (2008) studied the effect of drying on sensory quality of coriander leaves. The results indicated that, the leaves dried at ambient condition retained better organoleptic qualities compared to shade drying. The sun dried samples retained olive green colour while shade dried

samples had bright green colour. The leaves dried at 100 and 140°C turned brown to reddish brown and gave burnt appearance and flavor, while those dried at 40°C recorded better colour and organoleptic attributes. Limited studies are available in the literature with regard to preservation of greens. The present paper deals with screening of the suitability of coriander varieties for dried herbage

MATERIALS AND METHODS

The experiment was conducted in a Completely Rando mixed Design with three replications. The details of the treatments are as follows.

Treatment Details: Varieties

T ₁	-	CO-1
T ₂	-	CO-2
T ₃	-	CO-3
T ₄	-	CO-4
T ₅	-	RCr-20
T ₆	-	RCr-41
T ₇	-	RCr-435
T ₈	-	RCr-436
T ₉	-	RCr-446
T ₁₀	-	RCr-480
T ₁₁	-	RCr-684
T ₁₂	-	RCr-728
T ₁₃	-	DWD-3

Method

One kg each of green coriander herbage per treatment per replication in each variety was harvested at 45 days after sowing and a total of three kg in each variety constitutes three

replications.

Pretreatments

Coriander herbage was pretreated with 0.1 per cent magnesium chloride + 0.1 per cent sodium bicarbonate + 0.2 per cent potassium metabi sulphate in water for 15 minutes before drying.

Drying

The pretreated coriander herbage was dried in tray drier at 55p C for 5 hours uniformly.

Drying ratio

Drying ratio was calculated by dividing fresh weight of herbage by dry weight.

$$\text{Drying ratio} = \frac{\text{Fresh weight}}{\text{Dry weight}}$$

(Ranganna, 1991)

Rehydration ratio

Rehydration ratio is analysed by soaking 2 g dehydrated sample in 50 ml water at 60°C for 20 minutes, excess water was drained and the sample was weighed and rehydration ratio was calculated by the following formula.

$$\text{Rehydration ratio} = \frac{\text{weight of the rehydrated sample}}{\text{weight of the dehydrated sample used for the test}}$$

(Ranganna, 1991)

Colour estimation

Colour of the fresh and dried coriander herbage was estimated by using a Lovibond colour meter in terms of L^* (lightness), a^* (red-green) and b^* (blue-yellow).

Sensory evaluation (Score out of 9.00)

Organo leptic evaluation of dried coriander herbage was carried out on a 9 point Hedonic scale using the score card mentioned below by 15 semi trained judges. The organoleptic characters like colour, flavor and aroma and overall acceptability were recorded.

Score card for organoleptic evaluation (Ranganna, 1991)

Colour	Flavour and aroma	Overall Acceptability	Scores
Highly attractive	Excellent	Extremely acceptable	8-9
Very attractive	Very good	Very acceptable	7-8
Moderately attractive	Good	Moderately acceptable	6-7
Slightly attractive	Fair	Slightly acceptable	5-6
Not attractive	Poor	Not acceptable	0-5

RESULTS AND DISCUSSION

Drying ratio

Drying ratio of dried coriander herbage was presented in table 1. Among the 13 varieties evaluated, the drying ratio was ranging between 3.49-5.42. The highest drying ratio was recorded in RCr-480 (5.42) as against least in RCr-435 (3.49). The higher drying ratio in the var. RCr-480 could be due to inherent composition of the variety and the drying ratio is directly proportional to the dry matter content and it is a varietal trait.

Rehydration ratio

Rehydration ratio of dried coriander herbage was presented in table 1. Among the 13 different varieties, the highest rehydration ratio was found in DWD-3 (4.23) as against the least in RCr-20 (3.00). The higher rehydration ratio in the var. DWD-3 could be due to the higher capacity of the variety to absorb the moisture and the difference in moisture uptake between the varieties can be attributed to variation in the type of variety, structural components and interactions between the components during dehydration (Rajeswari, 2010).

Colour estimation

Colour estimation of fresh and dried coriander herbage was presented in table 2. In fresh coriander herbage, the mean values of lightness (L^*) revealed that variety RCr-446 was towards the lightness (58.07) compared to all the other varieties. This could be due to the varying levels of pigments and other biochemicals that could impact the colour of the herbage. The composition of the biochemical constituent is highly specific to the inherent quality of the variety.

The mean values of L^* decreased from fresh herbage (40.09) to dried herbage (36.67). This is expected because drying of herbage would leads to loss of moisture and pigments that could probably lead to decrease in the values for Lightness.

Table 1: Drying and rehydration ratio of coriander herbage as influenced by different varieties

Treatments	Varieties	Drying ratio	Rehydration ratio
T ₁	CO-1	5.18	3.33
T ₂	CO-2	5.00	4.17
T ₃	CO-3	4.69	4.17
T ₄	CO-4	4.69	4.00
T ₅	RCr-20	3.61	3.00
T ₆	RCr-41	5.03	3.33
T ₇	RCr-435	3.49	3.67
T ₈	RCr-436	4.85	4.17
T ₉	RCr-446	4.54	3.17
T ₁₀	RCr-480	5.42	3.77
T ₁₁	RCr-684	4.68	4.00
T ₁₂	RCr-728	4.41	4.17
T ₁₃	DWD-3	4.85	4.23
	Mean	4.65	3.78
	SEmCD (P = 0.01)	0.190.73	0.140.54

Table 2: Colour (L^* a^* b^*) values of fresh and dried coriander herbage as influenced by different varieties

Treatments	Varieties	Fresh herbage			Dried herbage		
		L^*	a^*	b^*	L^*	a^*	b^*
T ₁	CO-1	38.56	-9.31	25.64	32.94	-1.65	17.56
T ₂	CO-2	42.34	-9.82	30.14	33.88	-3.64	19.55
T ₃	CO-3	32.71	-5.79	20.85	37.68	-2.44	20.75
T ₄	CO-4	34.63	-5.88	21.70	34.71	-0.87	18.38
T ₅	RCr-20	41.02	-6.25	28.20	39.26	-4.35	18.13
T ₆	RCr-41	32.80	-5.05	21.64	39.57	-5.68	21.42
T ₇	RCr-435	38.95	-6.68	21.48	36.30	-0.48	20.11
T ₈	RCr-436	41.84	-8.53	20.08	35.49	-0.70	18.63
T ₉	RCr-446	58.07	-8.78	39.31	39.57	-1.65	21.46
T ₁₀	RCr-480	41.15	-7.85	25.99	34.28	-1.57	16.95
T ₁₁	RCr-684	49.65	-9.40	29.13	44.51	-1.17	19.53
T ₁₂	RCr-728	31.33	-8.15	21.60	34.74	-4.35	19.78
T ₁₃	DWD-3	38.06	-6.88	21.72	33.73	-0.88	17.77
	Mean	40.09	-7.57	25.19	36.67	-2.26	19.23
	SEmCD (P = 0.01)	1.596.24	0.622.43	0.592.30	1.746.85	0.461.88	0.97NS

L^* = Lightness; a^* = Red-Green; b^* = Blue-Yellow

Table 3: Sensory characteristics of dried coriander herbage as influenced by different varieties

Treatments	Varieties	Colour(score out of 9.00)	Flavour and aroma (score out of 9.00)	Overall Acceptability (score out of 9.00)
T ₁	CO-1	6.23	7.17	6.70
T ₂	CO-2	7.93	7.37	7.77
T ₃	CO-3	6.77	7.57	7.23
T ₄	CO-4	6.90	7.23	7.03
T ₅	RCr-20	7.57	7.03	7.28
T ₆	RCr-41	7.43	6.83	7.13
T ₇	RCr-435	8.00	7.54	7.77
T ₈	RCr-436	6.53	7.43	6.98
T ₉	RCr-446	7.03	6.83	6.93
T ₁₀	RCr-480	7.27	7.07	7.18
T ₁₁	RCr-684	7.23	7.57	7.37
T ₁₂	RCr-728	7.07	7.23	7.18
T ₁₃	DWD-3	6.63	7.97	7.27
	Mean	7.12	7.26	7.21
	SEmCD (p = 0.01)	0.040.15	0.030.13	0.030.11

The variations in L^* values of fresh and dried herbage could be due to the varietal effect because individual variety respond differently to drying.

The mean values for redness (a^*) decreased from (-7.57) to (-2.26) indicating changing of colour from dark green to light green. This could be due to loss of chlorophyll during the process of drying leading to loss of green colour. The variations within the variety could be inherent quality of the particular variety showed.

Among the 13 varieties studied it was observed that, the (b^*) value was towards the yellowness for both fresh and dried herbage and there were no significant difference for dried herbage with respect to (b^*) value.

Sensory evaluation

The sensory qualities of products are an important tool for indicating the consumer acceptability. Human preference plays an important role in evaluation of organoleptic character of a product. The data on organoleptic evaluation pertaining to the colour, flavour and aroma and overall acceptability differed significantly and it was presented in Table 3.

The highest score for colour was observed in RCr-435. The

highest score for flavour and aroma was observed in DWD-3 and the overall acceptability was recorded in RCr-435 due to its higher score for colour, flavor and aroma. Similar variations among the different varieties with respect to organoleptic characters were reported by several workers (Esturk and Soysal, 2010; Fatima *et al.*, 2001).

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