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Comparative analysis of coriander (*Coriandrum sativum* L.) varieties for quality traits

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Abstract

Coriander varieties were assessed for quality traits viz., essential oil, non volatile ether extracts and crude fiber under south eastern Rajasthan conditions (Zone V). The variation observed among the varieties was significant for all the traits studied. Among all RKD-18 (Raj Pratap Dhania-1) was found to have high essential oil.

Keywords: Coriander, essential oil, crude fibre

Introduction

Coriander (*Coriandrum sativum* L.) is an important seed spice crop of Mediterranean origin widely cultivated in India for seed and leaf. Rajasthan is the major coriander producing state in the country. In Rajasthan, the south eastern humid plain zone (zone V) contributes about 98 percent of total coriander area and production. This implies that the agroclimatic conditions of this zone are particularly favourable for coriander production as the productivity of the crop in the zone is also higher than the state average. Kota (covered under zone V) is situated in between 25 11 N latitude and 75 54 longitude at 273 m altitude from mean sea level. It is covered under the humid south eastern plain zone (zone V) of Rajasthan. The rainfall varies from 650 mm to 1000 mm. The maximum mean daily temperature ranges from 24.5 C in the month of January and 42.6 C in May and minimum 10 C in January and 19.7 C in month of May. The predominant soil of the zone has black soils of alluvial origin with clay loam to clay in texture.

The aroma of coriander is due to the presence of aromatic volatile compounds. Nowadays demand for volatile oil in the international market is going on increasing. The advantage of use of volatile oil is that it is 100 times more concentrated than the spice powder and hence is required in very less quantity and secondly, the colour of the food products to which the volatile oil is added remains unaltered. The preparation of different value added products require different quality parameters in a definite proportion in the average composition of seed. Keeping the above facts in view, an attempt has been made in the present investigation to compare the different check varieties of coriander for quality parameters in order to find out the most suitable variety for the preparation of different value added products.

Materials and methods

In the present investigations, eleven varieties of coriander were studied for the quality estimates viz., essential oil, fixed oil and crude fiber. The crop was raised in the year 2009 at ARS, Ummedganj Agricultural University, Kota. Coriander crop was harvested when 50 % seeds turned yellow. Representative samples were taken from the lot for analysis. The seeds were dried in the shed till around 12 % moisture remained. Total essential oil was estimated using Klevenger apparatus designed for extraction of essential oil lighter then water (AOAC, 1955a). Total nonvolatile ether extract was estimated using soxhlet apparatus (AOAC, 1955b). The crude fibre was also estimated according to standard method (AOAC, 1955c)

Results and Discussion

According to national and international quality specifications of coriander, the seed should have a minimum of 0.3% of volatile oil on volume by weight basis, a maximum of 15% crude fiber and a maximum of 10% moisture. In the present investigation, the coriander varieties differed among themselves with respect to the different quality traits as shown in Table 1. The highest essential oil content was found in RKD – 18 followed by CS – 2 and RCr – 480 while it was lowest in CS – 6, Hisar Anand, RCr – 41 and RCr – 20 which were at par with each other. The oleoresin content was found to be highest in Hisar Anand followed by CS – 6 and RKD – 18 and lowest in Pant Haritima, RCr- 20 and RCr – 436. The crude fibre percent was highest in CS – 6, RCr – 728 and RCr – 41and lowest in RCr – 436, Hisar Anand and RKD – 18. The highest percent moisture was obtained in Hisar Anand, CS – 6 and RCr – 728 whereas; it was lowest in RCr- 41, RCr – 480, RCr – 20 and RKD – 18. The desirable quality parameters of coriander for preparation of value added products or its direct consumption as whole or in ground form particularly includes percent essential oil and oleoresin content. This implies that higher the percent of these important parameters, the superior will be the quality. Besides these, the percentage of crude fibre and moisture should be considerably less as these components interfere with the extraction of essential oil and oleoresin from the seed for

the preparation of value added products. In view of this, the coriander check varieties *viz*., RKD -18, Hisar Anand, RCr -480, CS -2 seems to be more suitable for processing for the development of value added products and establishment of industries thus, improving the rural economy.

Table 1: Essential oil, non volatile ether extract and crude fibre content in coriander genotypes/varieties

S. No.	Varieties	State	Essential oil %	Non volatile ether extract	Crude fibre
1.	RCr-41	Rajasthan	0.30	16.05	28.03
2.	RCr-20	Rajasthan	0.30	15.64	27.49
3.	RCr-480	Rajasthan	0.36	16.71	27.22
4.	RCr-436	Rajasthan	0.36	15.88	26.58
5.	RCr-728	Rajasthan	0.31	17.00	28.71
6.	CS-6	Tamil Nadu	0.30	18.03	29.41
7.	CS-2	Tamil Nadu	0.40	16.52	27.43
8.	CS-7	Tamil Nadu	0.40	16.89	27.43
9.	Hisar Anand	Haryana	0.30	18.22	26.61
10.	Pant Haritma	Uttar Pradesh	0.33	14.89	26.08
11.	RKD-18 (Pratap Raj Dhania-1)	Rajasthan	0.45	17.57	26.89
	CV		15.25	12.36	10.52
	CD		0.032	2.09	2.56

Similar studies were done by Alejandra *et. al*. (2002), they observed more stable concentration of major essential oil components in the European landrace compared to the Argentinean landrace. Suggesting, the variation in the oil composition related to the relative proportions of the constituents and not to the presence/absence of a particular component. Weather conditions significantly influenced the flavor *i.e.*, by altering the linalool and camphor in the experimental material and treatment. Location, fertilization, and weediness also affect the chemical profile. These results shows the relationship between some environmental factors and the essential oil composition, may be useful in the development of innovative strategies aimed to improve oil composition and to manage crop pests. Telci *et al*., (2006) also observed significant variation in the oil content between varieties, *i.e., microcarpum* had higher oil content. The compositions of the two varieties were quantitatively similar, although the linalool content was higher in *microcarpum* (6.35-71 %) that *vulgare* (42.1 – 52.7 %). They reported that ecological variation had a significant effect on the biomass and seed yields.

Lopez *et. al* (2007) concluded that phenotypic and biochemical characterization enables us to distinguish coriander accessions on the basis of their suitability for special uses. The accessions with high 1000 seed weight and short life cycle may be well suited for use of their fruit as a spice while the accessions with high overall essential oil content and intermediate life cycle exhibited the highest linalool yield per plant and may be more suitable for processing.

Asif *et. al*. (2013) reported significant variation in the chemical composition of the essential oil of five varieties from different origin of Bangladesh and owed this variation to the geographic divergence and ecological conditions. It is reported that the climate and weather conditions during the growth and more important that the nature of the soil with regard to the volatile oil content. Meena *et. al*. (2013) also reported that the genotype RKD-18 was superior to others in terms of seed yield, test weight, essential oil and also showed highest net return and B:C ration and, therefore, it is most suitable and profitable for the south eastern humid plains of Rajasthan. Our results are in conformity with the previous studies that the expression of performance of the varieties in terms of quantity (seed yield) and quality (essential oil content and its composition) is highly environmental sensitive and it depends on the different interaction of a particular genotype/variety with a particular environment. Coriander is a highly cross pollinated crop which is also reported to show significant G x E interactions, therefore, a single variety may not perform equally well in the all the environments. So a comparative study of the released varieties should be necessarily made before its general recommendation for a particular agroclimatic zone. On the basis of the present study, it can be concluded that RKD-18 (Pratap Raj Dhania-1) seems to one of the most suitable variety for the south eastern humid plain (zone V) of Rajasthan

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