



Plant Archives

Journal homepage: <http://www.plantarchives.org>

DOI Url : <https://doi.org/10.51470/PLANTARCHIVES.2025.v25.no.2.369>

EVALUATION OF CORIANDER GERMPLASM FOR EARLY VIGOR AND GERMINATION CHARACTERS

J. Lakshmi Chandana^{1*}, C. Madhumathi², Syed Sadarunnisa³, B. Tanuja Priya⁴, M. Jayaprada⁵ and Y. Sireesha⁶

¹Department of Vegetable Science, Dr. YSRHU, College of Horticulture, Anantharajupeta, Andhra Pradesh, India.

²Director of Research, Dr. YSRHU, Administrative Office, Venkataramannagudem, Andhra Pradesh, India.

³Department of Horticulture, Dr. YSRHU, College of Horticulture, Anantharajupeta, Andhra Pradesh, India.

⁴Department of Horticulture, Dr. YSRHU- HRS, Lam, Guntur, Andhra Pradesh, India.

⁵Department of Genetics and Plant Breeding, Dr. YSRHU-College of Horticulture, Anantharajupeta, Andhra Pradesh, India.

⁶Department of Plant Pathology, Dr. YSRHU- Scientist, BRS, Pulivendula, Andhra Pradesh, India.

*Corresponding author E-mail : javvadichandana1997@gmail.com

(Date of Receiving-22-07-2025; Date of Acceptance-02-10-2025)

ABSTRACT

The experiment entitled “Evaluation of Coriander Germplasm for Early Vigor and Germination Characters” was carried out in college of horticulture Anantharajupeta. The objective of the present study was to assess physical, viability, seedling and vigour parameters of 56 coriander genotypes and 4 check varieties. On the basis of mean performance for physical parameters best genotype A16 has been identified as the best genotype for the seed quality parameters viz., germination percentage (97 %) mortality percentage (3%), Days taken to 50 percent seed germination (6.48), Seed vigour index (909.86) and Speed of germination (14.21). A22 genotype showed better performance regarding germination parameters such as seedling length A22 (9.45). Number of days taken for germination A22 genotype recorded 7 days to get complete germination.

Key words : Coriander, Germination, Speed of germination, Seed vigour index.

Introduction

Coriander (*Coriandrum sativum* L.) is a tropical and sub-tropical crop indigenous to southern Europe and the Mediterranean region. The word coriander is derived from the Greek name for bug “kurion” (Diederichsen, 1996). The green, young coriander leaves are also known as cilantro and are used as a herbal flavoring in the preparation of sauces, salads and seafood dishes and variety of ethnic foods. The coriander leaves are rich in minerals viz., calcium (1246 mg/100 g), iron (42.46 mg/100g), magnesium (694 mg/100g), phosphorus (481 mg/100g), potassium (4466 mg/100g), sodium (211 mg/100g), zinc (4.72 mg/100g), vitamin C (566.7 mg/100g) (USDA, 2013). It is a well-known ayurvedic medicinal plant in India known as “Dhaniya.” This plant can also be used to treat the disease such as digestive system disorders, respiratory tract disorders and urinary tract infections.

Coriander has been shown to have a pharmacological

activity, such as antioxidant, anti-diabetic, anti-mutagenic, antilipidemic, and anti-spasmodic properties (Darughe *et al.*, 2012). It is mainly cultivated as a rabi crop in India as Coriander requires cool climate during growth and warm dry climate during seed maturity. It can be cultivated in all types of soils but comes up well on well drained loamy soils. Though it is cultivated across the country but production is concentrated in Madhya Pradesh, Rajasthan, Gujarat, Assam, West Bengal, Orissa, Uttar Pradesh and Andhra Pradesh. Further, due to high value of seed spices, the quality of seeds becomes more important. This is mainly measured by its high genetical and physical purity, free from insect-pest and diseases, high vigour, germination percentage and uniformity in appearance. The germination test does not reflect field performance potential of a seed lot of any genotype under varying field conditions. However, the seed vigour testing is comprised of evaluation of all those properties that determines the potential of rapid, uniform emergence and

development of normal seedling under wide range of field conditions. The advantages of high vigour seed are most often associated with rapid and high rate of emergence and stand establishment. There is also a need to have some more reliable parameters that evaluate the seed quality before it is sown in the field. It is also observed that the seed quality and storage capacity are correlated to each other (Singh *et al.*, 2015).

Materials and Methods

The present investigation was carried using 56 coriander germplasm (local genotypes) and 4 check varieties (C-1 Arka Isha, C-2 Sudha, C-3 Susthira, C-4 Pant haritima) in completely randomized design during rabi season. From each genotype, randomly 100 seeds are selected and used in this experiment.

Germination percentage (%)

Germination percentage was calculated by dividing the number of seeds germinated to the total number of seeds sown in each plot and expressed in percentage.

$$\text{Germination \%} = \frac{\text{Number of seeds germinated}}{\text{Total number of seeds sown}} \times 100$$

Mortality percentage (%)

Mortality percentage was calculated by dividing the number of seeds not germinated to the total number of seeds sown in each tray and expressed in percentage.

$$\text{Mortality percentage} = \frac{\text{Number of seeds not germinated}}{\text{Total number of seeds sown}} \times 100$$

Days taken to 50 percent seed germination

The number of days taken to complete 50 percent seed germination in coriander was recorded and expressed in days.

Number of days taken for germination

The number of days taken for germination was recorded separately and expressed in days.

Speed of germination

The speed of germination was determined by dividing the germination percentage with the number of days taken for germination and expressed in percentage.

Speed of germination = $n_1/1 + n_2/2 + n_3/3 + \dots n_x/x$
= N Where $n_1 \dots n_x$ are the number of seeds germinated on day 1 to days x and 1.....x are number of days

Seed vigour index (SVI)

Seed vigour index was computed by using the formula as suggested by Abdul Baki and Anderson (1973).

Seed vigour index (SVI) = Germination % × Seedling

length (cm)

Seedling length (cm)

Ten normal seedlings were selected randomly from each treatment on the day of final count. The seedling length was measured from tip of shoot to root tip and the mean length will be calculated and expressed as seedling length in centimeters.

Results and Discussion

Germination percentage

Significant difference was observed among the genotypes it ranged from 86 – 97% with a mean value of 92.75%. Ten genotypes recorded higher germination (%) compared to the best check, C-1 (95%). The significantly higher germination was recorded in the genotype A16 (97%) was on par with 42 genotypes and 9 genotypes A7, A14, A15, A22, A27, A32, A46, A50, A54 (96%) and lowest germination (%) was recorded in genotype A38 (86%) (Fig. 1). The reason for varying germination percentage among the seasons can be attributed to the varying soil and air temperature and day length at the time of germination. The genetic constituency of each genotype endowed with certain capacity to meet the conditions and take advantage of them during the germination, which might be the reason for differences in germination among the genotypes. Similar results of germination percentage of coriander cultivars were reported by Dhokle *et al.* (2010) and Ewase *et al.* (2013), Suman *et al.* (2018), Singh and Malik (2021).

Mortality percentage

Mortality (%) had recorded significant differences among the genotypes it ranged from 3 – 14 % with a mean value of 7.25%. Ten genotypes recorded lower mortality (%) compared to the best check, C-1 (5%). The significantly minimum mortality (%) was recorded in the genotype A16 (3%) followed by A7, A14, A15,

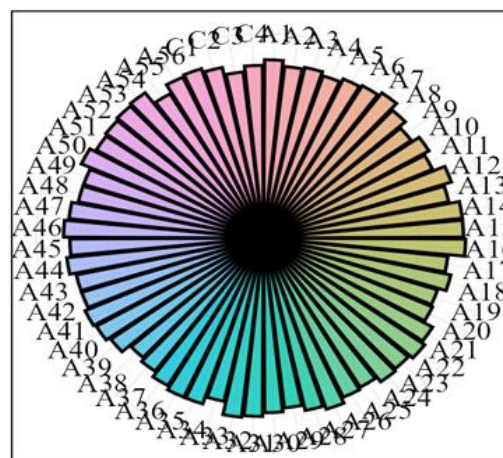


Fig. 1 : Circular bar plot of germination%.

Table 1 : Mean performance for germination parameters of coriander germplasm.

	Germination (%)	Mortality (%)	Days taken to 50 percent seed germination	Number of days taken for germination	SVI 1	Speed of germination	Seedling length
A1	95	5	9.25	11.00	547.58	9.72	5.76
A2	92	8	7.97	10.00	695.52	11.28	7.56
A3	93	7	8.93	11.00	547.77	9.74	5.89
A4	91	9	8.91	10.00	515.97	9.65	5.67
A5	93	7	7.50	8.00	701.22	11.63	7.54
A6	94	6	8.67	12.00	560.24	9.93	5.96
A7	96	4	8.14	9.00	696.00	11.22	7.25
A8	92	8	8.92	10.00	526.24	9.76	5.72
A9	88	12	9.13	11.00	476.96	9.36	5.42
A10	92	8	8.52	9.00	580.52	10.26	6.31
A11	89	11	10.48	12.00	368.46	8.05	4.14
A12	95	5	7.48	8.00	798.95	12.31	8.41
A13	91	9	8.18	11.00	596.05	10.42	6.55
A14	96	4	8.27	9.00	692.16	11.29	7.21
A15	96	4	8.27	10.00	666.24	10.88	6.94
A16	97	3	6.48	8.00	909.86	14.21	9.38
A17	89	11	8.74	10.00	492.17	9.57	5.53
A18	92	8	9.66	10.00	461.84	8.98	5.02
A19	88	12	10.23	12.00	709.28	10.23	8.06
A20	89	11	9.15	11.00	458.35	9.10	5.15
A21	94	6	8.48	10.00	661.76	10.98	7.04
A22	96	4	6.50	7.00	907.20	13.86	9.45
A23	94	6	8.93	10.00	524.52	9.53	5.58
A24	95	5	9.90	12.00	521.55	9.47	5.49
A25	92	8	8.20	11.00	591.56	10.52	6.43
A26	93	7	9.93	11.00	450.12	8.91	4.84
A27	96	4	8.93	11.00	598.08	10.29	6.23
A28	94	6	8.35	9.00	590.32	10.49	6.28
A29	91	9	8.91	10.00	499.59	9.66	5.49
A30	93	7	7.78	9.00	663.09	11.02	7.13
A31	95	5	10.69	12.00	443.65	8.55	4.67
A32	96	4	8.93	11.00	612.48	10.29	6.38
A33	89	11	9.15	11.00	683.52	11.88	7.68
A34	93	7	9.71	11.00	499.41	9.46	5.37
A35	93	7	9.83	11.00	487.32	9.24	5.24
A36	91	9	10.28	10.00	383.11	9.45	4.21
A37	88	12	9.20	10.00	440.88	9.07	5.01
A38	86	14	8.77	10.00	448.92	9.24	5.22
A39	91	9	8.52	9.00	547.82	10.08	6.02
A40	93	7	10.23	12.00	471.93	9.14	5.07
A41	94	6	8.68	11.00	576.22	10.22	6.13
A42	92	8	9.30	11.00	484.84	9.35	5.27
A43	92	8	10.56	13.00	385.48	8.32	4.19

Table 1 continued...

Table 1 continued...

A44	95	5	9.92	13.00	477.85	9.17	5.03
A45	93	7	9.41	11.00	493.83	9.42	5.31
A46	96	4	7.60	9.00	717.12	11.78	7.47
A47	94	6	8.28	10.00	647.66	11.03	6.89
A48	91	9	12.14	15.00	251.16	6.95	2.76
A49	91	9	9.85	11.00	429.52	8.95	4.72
A50	96	4	6.97	9.00	827.52	12.78	8.62
A51	93	7	9.93	11.00	435.24	8.81	4.68
A52	94	6	8.57	10.00	594.08	10.45	6.32
A53	95	5	9.57	12.00	517.75	9.62	5.45
A54	96	4	8.56	13.00	627.84	10.66	6.54
A55	89	11	10.45	13.00	374.69	8.04	4.21
A56	94	6	10.68	13.00	411.72	8.44	4.38
C-1	95	5	7.18	9.00	681.15	12.19	7.17
C-2	93	7	8.75	9.00	663.09	10.39	7.13
C-3	89	11	8.96	9.00	614.99	10.07	6.91
C-4	92	8	7.66	8.00	654.12	12.12	7.11
C.D.	5.415	0.448	0.527	0.618	33.826	0.596	0.364
SE(m)	1.931	0.16	0.188	0.22	12.065	0.213	0.13

A22, A27, A32, A46, A50, A54 (4%) and highest mortality (%) was recorded in genotype A38 (14%) (Fig. 2).

Days taken to 50 percent seed germination

Days taken to 50 percent seed germination varied among the genotypes it ranged from 6.48 – 12.14 with a mean value of 8.95. Three genotype recorded significantly lower number of days taken to 50 percent seed germination compared to the best check, C-1 (7.18). The significantly lower days taken to 50 percent seed germination was recorded in the genotype A16 (6.48) was on par with A22 (6.5) and A50 (6.97) and highest days taken to 50 percent seed germination was recorded in genotype A48 (12.14) (Fig. 3).

Number of days taken for germination

The results regarding days taken for germination revealed a significant difference among the genotypes it ranged from 7 – 15 with a mean value of 10.48. One genotype recorded lowest number of days taken for germination A22 (7) compared to the best check, C-4 (8). The significantly lowest number of days taken for germination was recorded in the genotype A22 (7) followed by A5, A12, A16 (8) and maximum number of days taken for germination was recorded in genotype A48 (15).

Seed vigour index 1

Significant difference was observed in SVI. Among the genotypes it ranged from 251.163 – 909.857 with a mean value of 564.90. Eleven genotypes recorded higher

compared to the best check, C-1 (681.153). The significantly highest SVI-1 was recorded in the genotype A16 (909.86) on par with A22(907.2) followed by A50 (827.52), A12 (798.95) and lowest SVI-1 was recorded in genotype A48 (251.163). Seed vigour index which distinguishes between strong or weak genotypes was found highly variable among the genotypes. This might be due to the ability of genotypes to sustain the vigour and viability over prolonged periods, which essentially originates from their genetic makeup. Apart from this, the season of evaluation compounded with various weather parameters might have played a critical role in the expression of genotypes. Similar results were observed by Singh and Malik (2021).

Speed of germination

There was noticeable variation in speed of germination. Among the genotypes it ranged from 6.95-14.21 with a mean value of 10.12 %. Four genotypes recorded significantly higher speed of germination compared to the best check, C-1 (12.19). The significantly higher speed of germination was recorded in the genotype A16 (14.21) was on par with A22 (13.87) and lowest speed of germination was recorded in genotype A48 (6.95%). The difference seed of germination is a genotypic character; however, it is also influenced by the environment and G x E interaction. Similar differences in speed germination among genotypes were reported by Dhokle *et al.* (2010) Lal *et al.* (2014), Suman *et al.* (2018) and Reddy *et al.* (2020).

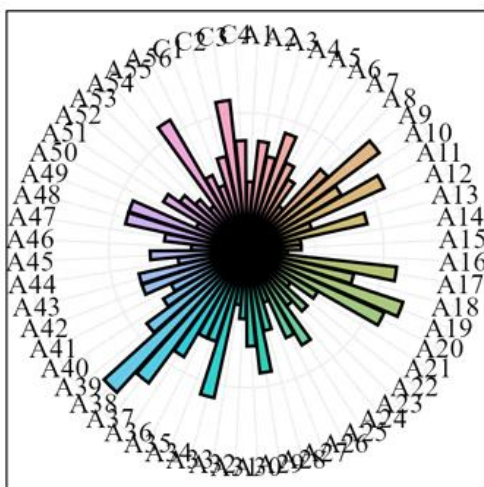


Fig. 2 : Circular bar plot of mortality%.

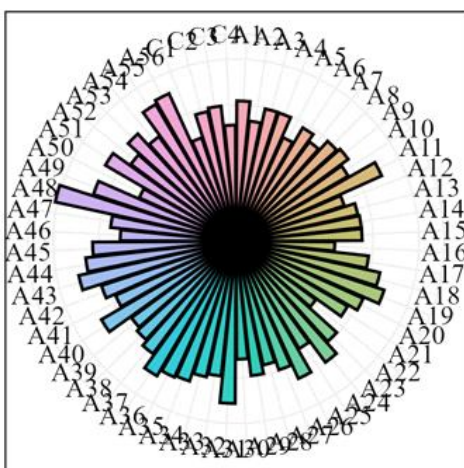


Fig. 3 : Circular bar plot of days taken to 50 percent seed germination.

Seedling length

Considerable variations were measured with respect to seedling length. Among the genotypes it ranged from 2.76 – 9.45 with a mean value of 6.07%. Eleven genotypes recorded significantly higher seedling length compared to the best check, C-1 (7.17). The significantly maximum seedling length was recorded in the genotype A22 (9.45) was on par with A16 (9.38) and minimum seedling length was recorded in genotype A48 (2.76%). Similar results of seedling length of coriander cultivars were reported by Suman *et al.* (2018) and Singh and Malik (2021).

Conclusion

It can be concluded that the performance of genotypes can be affected by inherent genetic material

as well as environmental factors. Among sixty genotypes of coriander studied, A16, A22, A7, A14, A15, A22, A27, A32, A46, A50, A54 have been identified as the best genotypes in respect of their better performance in terms of the seed quality parameters viz, Germination (%), Mortality (%), Days taken to 50 percent seed germination, Number of days taken for germination (days), Speed of germination, Seed vigour index (SVI), Seedling length and same can be used for further breeding programmes.

References

- Abdul-Baki, A.A. and Anderson J.D. (1973a). Vigour determination in soybean seed by multiple criteria. *Crop Sci.*, **13**, 630-633.
- Darughe, F., Barzegar M. and Sahari M.A. (2012). Antioxidant and antifungal activity of Coriander (*Coriandrum sativum* L.) essential oil in cake. *Int. Food Res. J.*, **19** (3), 1253-1260.
- Dhokle, G.C., Naik P.G., Suryawanshi A.B. and Phad G.N. (2010). Performance of different varieties of coriander for yield, quality and germination under Marathwada conditions. *The Asian J. Horticult.* (December 2009 to May 2010), **4**(2), 355-357.
- Diederichsen, A. (1996). Coriander (*Coriandrum sativum*). *International Plant Genetic Resources Institute (IPGRI)*, Rome, 245 pp
- Ewase, A.E.S., Omran S., El-Sherif S. and Tawfik N. (2013). Effect of salinity stress on coriander (*Coriandrum sativum*) seeds germination and plant growth. *Egypt. Acad. J. Biolog. Sci.*, **4**(1), 1-7.
- Lal, G., Mehta R.S., Maheria S.P. and Sharma Y. (2014). Influence of sulphur and zinc on growth and yield of coriander (*Coriander sativum* L.). *Int. J. Seed Spices*, **4**(2), 32-35.
- Reddy, A.N., Chaurasia A.K. and Sutnga E. (2020). Assessment of Different Priming Methods on Germination and Quality Parameters of Coriander (*Coriandrum sativum* L.). *Int. J. Curr. Microbiol. App. Sci.*, **9**(11), 3030-3038.
- Singh, B., Bhuker A., Mor V.S., Dahiya O.S. and Punia R.C. (2015). Effect of natural ageing on seed quality of fenugreek (*Trigonella foenum-graecum* L.). *Int. J. Scientific Res. Sci. Technol.*, **1**(4), 243-248.
- Singh, K. and Malik T.P. (2021). Assessment of seed quality parameters in coriander genotypes (*Coriandrum sativum* L.). *Indian J. Pure Appl. Biosci.*, **9**(2), 115-121.
- Suman, R.K., Kant K., Meena S.P. and Dugeasr V. (2018). Evaluation of Seed Quality Parameters in Coriander (*Coriandrum sativum* L.). *Int. J. Curr. Microbiol. App. Sci.*, **7**(7), 368-373.