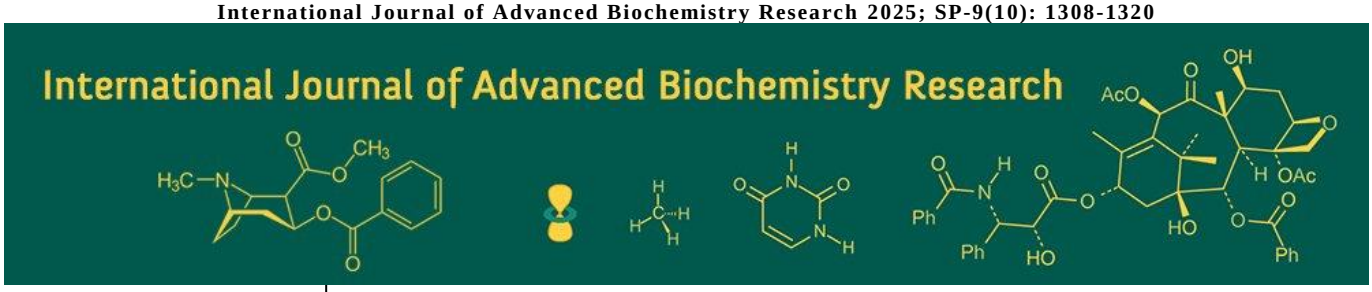

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Comparative studies on seed treatment storability and quality attributes of chilli (*Capsicum annuum* L.) cultivars

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Abstract
The present investigation was carried out to assess variability in seed quality among cultivars and to evaluate the effect of fungicide seed treatments on storability under ambient conditions. Eight chilli cultivars, including locally popular types such as Byadagi dabbi, Byadagi kaddi, Devanur dabbi, Devanur deluxe, Khanapur local, Bellary dabbi, Guntur and the improved cultivar Rudra were evaluated for seed health and quality parameters.

Significant variation was observed among cultivars, where Rudra exhibited superior seed quality with the highest germination (89.33%), longer seedlings, maximum vigour indices, the lowest electrical conductivity (326.53 µS/cm), reduced moisture (8.01%), and the least seed infection (3.00%). Conversely, Devanur dabbi showed poor germination (72.00%), weak vigour, high electrical conductivity (580.11 µS/cm) and maximum seed infection (7.33%). Mycoflora analysis detected *Colletotrichum* sp., *Fusarium* sp., *Aspergillus* sp. and *Rhizopus* sp.

A study was conducted to know the storability of chilli cultivars using Rudra (high-performing) and Devanur dabbi (low-performing) under eight fungicide treatments stored in 700 gauge polythene bags for ten months. Trifloxystrobin 25% + Tebuconazole 50% WG @ 2.0 g/kg (T_8) and Penflufen 13.28% + Trifloxystrobin 13.28% (T_6) proved most effective treatments in maintaining seed quality over ten months of storage when compared to untreated control. Among the cultivar and treatment interaction, the Rudra with Trifloxystrobin 25% + Tebuconazole 50% WG @ 2.0 g/kg (C_1T_8) combination retained the highest seed quality, even after ten months of storage, whereas untreated Devanur dabbi (C_2T_1) seeds declined sharply.

The study revealed Rudra was identified as the most promising cultivar which showed significant cultivar variability in terms of seed quality and storability. Whereas, farmer collected cultivars showed inferior seed quality due to poor management, post-harvest practices, storage and genetic variation. Fungicide seed treatments, especially the fungicide combination of Trifloxystrobin 25% + Tebuconazole 50% WG @ 2.0 g/kg, effectively delayed deterioration and enhanced viability.

Keywords: Chilli cultivars, seed quality, storability, fungicide treatments, variability, germination

Introduction
Chilli (*Capsicum annuum* L.) is one of the most valuable spice crops of the Solanaceae family (2n = 2x = 24). Originating in South America, it was introduced into India by the Portuguese in the late 15th century and has since become a staple in Indian agriculture and cuisine. Though it is perennial cultivated as an annual crop, thriving in warm and humid tropical to subtropical climates with optimal temperatures of 20-25 °C and soils with pH between 6.0 and 7.0. Chilli fruits are botanically berries but consumed as vegetables or spices are rich in vitamins A, C, B6, K, and minerals such as calcium, potassium and iron. Their pungency is attributed to capsaicinoids, especially capsaicin, which possesses antioxidant, anticancer, analgesic and anti-inflammatory properties (Fletcher *et al.*, 2000). Additionally, oleoresin extracted from chillies plays a vital role in food and beverage industries.

India is the world's leading producer, consumer and exporter of chillies, with production reaching 32.08 lakh tonnes in 2023-24 at an average productivity of 3,273 kg/ha. Andhra Pradesh and Telangana are the largest producers together contributing more than 50% of the national output. Karnataka accounts for about 1.87 lakh hectares under chilli, with production of 4.46 lakh tonnes and productivity of 2,385 kg/ha.

The state is famous for Byadagi Kaddi and Byadagi Dabbi varieties, particularly in districts like Dharwad, Haveri and Gadag (Anon., 2024) [4].

Despite the dominance of commercial varieties, smallholder farmers continue to rely heavily on farm-saved seed. Such seed is preferred because of its ready availability, familiarity and adaptability to local conditions (Coomes *et al.*, 2015; Hunduma *et al.*, 2021) [7, 11]. However, farmer-saved seeds often face challenges of genetic impurity, low vigour, contamination and seed-borne diseases. The quality of seeds is determined by genetic and physical purity, high germination and vigour and freedom from seed-borne pathogens (Seshu and Dadlani, 1989) [25]. Poor-quality seeds can reduce crop establishment, while high-quality seeds may increase yield by 5-20% (Seshu *et al.*, 1988) [25].

Chilli seeds are particularly vulnerable to fungal pathogens such as *Colletotrichum capsici*, *Fusarium oxysporum*, *Aspergillus niger*, *A. flavus*, *Alternaria alternata* and *Penicillium citrinum*. These can occur on the seed surface or internally, reducing germination, vigour and seed longevity (Ekhuemelo and Ebenezar, 2013) [8]. Seed-borne pathogens not only affect viability but may also transmit diseases to field crops, causing significant yield loss (Neergard, 1979) [23]. Hence, seed health testing and treatments are essential to eliminate infected seed lots (Rashid and Fakir, 2000) [24].

Chilli seeds, being hygroscopic and physiologically delicate with thin seed coats, have limited storability. Their quality is highly influenced by environmental factors such as temperature and relative humidity during storage. To reduce deterioration, storage in moisture-proof containers such as aluminium foil pouches, polythene bags or tins is recommended (Gupta *et al.*, 1989) [10]. However, one of the most effective and economical approaches to maintaining seed health is seed treatment. Chemical treatments using fungicides like tebuconazole, trifloxystrobin or their combinations reduce mycoflora by inhibiting enzyme production in fungi and can also improve seed vigour due to plant growth regulatory effects (Mehta *et al.*, 1990; Fletcher *et al.*, 2000) [19, 9]. Compared to foliar sprays, seed treatment requires minimal chemical use (1-1.5 g/kg seed) and offers long-term benefits during storage (Ayesha Mulla *et al.*, 2021) [5].

In conclusion, chilli seed quality and storability are constrained by susceptibility to seed-borne fungi and rapid physiological deterioration. Effective management strategies such as fungicidal seed treatment, proper storage packaging and controlled environmental conditions can significantly enhance seed longevity and field performance. Strengthening on-farm seed health management will benefit both the farming community and the seed industry.

Materials and Method

The present study was conducted to ascertain the assessment of the cultivars based on the seed quality and health status and to check the influence of seed treatment and storability of chilli seeds and also to understand seed quality and storability of locally available chilli seeds. The laboratory experiments were conducted in the Department of Seed Science and Technology for a period of 10 months (October 2024 to July 2025) in completely randomized design with three replications. The experiment consisted of eight cultivars which were, C_1: Byadagi dabbi, C_2: Byadagi kaddi, C_3: Devanur dabbi, C_4: Devanur deluxe, C_5: Khanapur local, C_6: Bellary dabbi, C_7: Guntur, C_8: Rudra. The farmer saved seeds of chilli were collected from chilli producing farmers from the region of Dharwad, Haveri, Bellary, Dyavanur and the Rudra chilli seeds taken from Agriculture Research Station, Devihosur and used for the experiment. Among the cultivars in the first experiment the one with the best and least seed health status and quality parameter were been selected from analysing the effect of the fungicide treatment on seed quality and storability of the cultivars. The experiment consists of eight treatments consisting of seven fungicides and one control. The laboratory experiment was conducted in the completely randomized design with factorial concept and was replicated three times. Factor 1: Cultivars, C_1: Rudra, C_2: Devanur dabbi, Factor 2: Seed Treatment T_1: Control (untreated), T_2: Seed treatment with Carbendazim 50 W.P @ 2.0 g/kg of seeds, T_3: Seed treatment with Propiconazole 25% EC @ 1.0 mL/kg of seeds, T_4: Seed treatment with Tebuconazole 2% DS @ 1.0 mL/kg of seeds, T_5: Seed treatment with Carboxin 37.5% + Thiram 37.5% @ 2.0 g/kg of seeds, T_6: Seed treatment with Penflufen 13.28% + Trifloxystrobin 13.28% @ 1.0 mL/kg of seeds, T_7: Seed treatment with Captan 70% + Hexaconazole 5% @ 1.0 mL/kg of seeds, T_8: Seed treatment with Trifloxystrobin 25% + Tebuconazole 50% WG @ 2.0 g/kg of seeds.

Observations recorded

During the course of the experiment, the seed quality parameters were recorded to evaluate the seed quality and health of the cultivars. Seed germination (%) the number of normal seedlings were counted at the end of the fourteenth day and were expressed as per cent germination. Root and shoot length (cm) ten normal seedlings were randomly selected for root and shoot length measurement on the final count day (the 14th day). The seedling vigour index-I was calculated by multiplying the per cent germination with total seedling length. The seedling vigour index-II was calculated by multiplying the per cent germination with mean seedling dry weight (Abdul-Baki and Anderson, 1973) [1]. The moisture content of the seed was calculated as per the ISTA (Anon., 2021) [3]. The moisture content was calculated on wet basis and expressed in per cent. The electrical conductivity (EC) of the leachate was measured by digital conductivity meter and expressed in µS/cm per five-gram seeds at 25 ± 1 °C. Detection and identification of seed infection was done by blotter paper method as per ISTA rules (Anon., 2021) [3].

From the screening of the all eight cultivars the seed quality parameters were found to be performed well in the cultivar Rudra as it was maintained well by research station, whereas the Devnur Dabbi was the least performing cultivar as it was having significantly highest seed infection percentage and low germination percentage. Then the storage experiment which was conducted for 10 months for the two cultivars to see the effect of the cultivars and treatment during the ambient storage condition.

Results

Seed germination (%): The results on seed germination as influenced by cultivars, fungicide seed treatments and their interactions during ten months of storage. Mean seed germination gradually declined from 73.79% at the second month to 52.31% at the end of storage, irrespective of treatments Table 1. Significant differences were observed among cultivars at all stages with Rudra (C_1) maintaining

the highest germination (60.04%) and Devanur Dabbi (C_2) recording the lowest (44.58%) after ten months. Seed treatments also exerted a significant influence, where Trifloxystrobin 25% + Tebuconazole 50% (T8) maintained the highest germination (60.33%), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T6) with 56.00%, while untreated control (T_1) showed the lowest (39.17%). Interaction effects were also significant with C_1T_8 (Rudra + Trifloxystrobin 25% + Tebuconazole 50%) sustaining the highest germination (69.33%), followed by C_1T_6 (63.33%), whereas the lowest germination was recorded in C_2T_1 (Devanur Dabbi + control) with 30.33%.

Root length (cm): The results on root length as influenced by cultivars, fungicide seed treatments and their interaction effects during ten months of storage are presented in Table 2. Mean root length gradually declined from 7.84 cm at the second month to 6.57 cm at the end of storage, irrespective of treatments. Significant differences were observed among cultivars, with Rudra (C_1) maintaining the highest root length (8.68 cm) and Devanur Dabbi (C_2) recording the lowest (4.46 cm) after ten months. Seed treatments also had a significant influence, where Trifloxystrobin 25% + Tebuconazole 50% (T_8) recorded the highest root length (6.87 cm), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6) with 6.71 cm, while untreated control (T_1) showed the lowest (6.19 cm). Interaction effects revealed that C_1T_8 (Rudra + Trifloxystrobin 25% + Tebuconazole 50%) produced the highest root length (9.09 cm), followed by C_1T_6 (8.85 cm), whereas the lowest was observed in C_2T_1 (Devanur Dabbi + control) with 4.23 cm.

Shoot length (cm): The results on shoot length as influenced by cultivars, fungicide seed treatments and their interaction effects during ten months of storage are presented in Table 3. The mean shoot length declined from 6.60 cm at the second month to 5.35 cm at the end of storage, irrespective of treatments. Significant differences were observed among cultivars, with Rudra (C_1) recording the highest shoot length (6.25 cm) and Devanur Dabbi (C_2) the lowest (4.19 cm) after ten months. Seed treatments also showed significant effects, where Trifloxystrobin 25% + Tebuconazole 50% (T_8) maintained the highest shoot length (5.58 cm), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6) with 5.47 cm, while untreated control (T_1) recorded the lowest (5.08 cm). Interaction effects revealed maximum shoot length in C_1T_8 (Rudra + Trifloxystrobin 25% + Tebuconazole 50%) at 6.47 cm, followed by C_1T_6 (6.17 cm), whereas the lowest shoot length was recorded in C_2T_1 (Devanur Dabbi + control) with 3.91 cm after storage.

Seedling vigour index-I: The results on seedling vigour index-I as influenced by cultivars, fungicide seed treatments, and their interactions during ten months of storage are presented in Table 4. The mean seedling vigour index-I declined steadily from 1105 at the second month to 651 at the end of storage, irrespective of treatments. Significant variation was observed among cultivars, with Rudra (C_1) recording the highest vigour index (915), while Devanur Dabbi (C_2) registered the lowest (387) after ten months. Seed treatments also had a marked effect, where Trifloxystrobin 25% + Tebuconazole 50% (T_8) recorded the maximum vigour index (781), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6) with 707, whereas untreated control (T_1) showed the lowest (469). Interaction effects revealed that C_1T_8 (Rudra + Trifloxystrobin 25% + Tebuconazole 50%) maintained the highest seedling vigour index-I (1098), followed by C_1T_6 (985), while C_2T_1 (Devanur Dabbi + control) recorded the lowest (247) at the end of storage.

Seedling vigour index-II: The results on seedling vigour index-II as influenced by cultivars, fungicide seed treatments, and their interaction effects during ten months of storage are presented in Table 5. The mean seedling vigour index-II declined from 2765 at the second month to 1664 at the end of storage, irrespective of treatments. Significant differences were noted among cultivars, with Rudra (C_1) recording the highest vigour index-II (2168), while Devanur Dabbi (C_2) recorded the lowest (1160) at the end of ten months. Seed treatments also showed a marked influence, where Trifloxystrobin 25% + Tebuconazole 50% (T_8) registered the highest vigour index-II (1991), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6) with 1822, while untreated control (T_1) recorded the lowest (1205). Interaction effects revealed that C_1T_8 (Rudra + Trifloxystrobin 25% + Tebuconazole 50%) maintained the highest vigour index-II (2580), followed by C_1T_6 (2333), whereas C_2T_1 (Devanur Dabbi + control) recorded the lowest (730) at the end of storage.

Seed moisture (%): The results on seed moisture as influenced by cultivars, fungicide seed treatments and their interaction effects during ten months of storage are presented in Table 6. With the advancement of storage, mean seed moisture content increased from 7.769% at the second month to 8.134% at the end of storage, irrespective of treatments. Significant differences were observed among cultivars, with Rudra (C_1) recording the lowest seed moisture (8.10%), while Devanur Dabbi (C_2) showed the highest (8.18%) after ten months. Seed treatments also had a significant effect, where Trifloxystrobin 25% + Tebuconazole 50% (T_8) maintained the lowest moisture content (8.039%), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6) with 8.064%, whereas untreated control (T_1) showed the highest (8.286%). Interaction effects revealed minimum seed moisture in C_1T_8 (Rudra + Trifloxystrobin 25% + Tebuconazole 50%) at 8.001%, followed by C_1T_6 (8.038%), while maximum seed moisture was observed in C_2T_1 (Devanur Dabbi + control) with 8.331% at the end of storage.

Electrical Conductivity (µS/cm): The results on electrical conductivity (µS/cm) as influenced by cultivars, fungicide seed treatments and their interactions during ten months of storage are presented in Table 7. As storage progressed, mean electrical conductivity increased from 521.42 µS/cm at the second month to 866.31 µS/cm at the end of storage, irrespective of treatments. Significant differences were noted among cultivars, with Rudra (C_1) recording the lowest conductivity (693.05 µS/cm), while Devanur Dabbi (C_2) registered the highest (1039.57 µS/cm) after ten months. Seed treatments also affected electrical conductivity, where Trifloxystrobin 25% + Tebuconazole 50% (T_8) showed the lowest value (774.28 µS/cm), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6) with 814.49 µS/cm, whereas untreated control (T_1) exhibited the highest (994.25 µS/cm). Interaction effects revealed that C_1T_8 (Rudra +

Trifloxystrobin 25% + Tebuconazole 50%) recorded the lowest conductivity (640.19 µS/cm), followed by C_1T_6 (661.50 µS/cm), while C_2T_1 (Devanur Dabbi + control) showed the highest (1232.10 µS/cm) at the end of storage.

Seed Infection (%): The results on seed infection as influenced by cultivars, fungicide seed treatments and their interactions during ten months of storage are presented in Table 8. Mean seed infection increased from 5.62% at the second month to 8.65% at the end of storage. Significant differences were observed among cultivars, with Rudra (C_1) recording the lowest infection (7.01%) and Devanur Dabbi (C_2) the highest (10.31%). Among treatments, Trifloxystrobin 25% + Tebuconazole 50% (T_8) showed the lowest infection (7.56%), followed by Penflufen + Trifloxystrobin (T_6) at 7.83%, while untreated control (T1) recorded the highest (9.94%). Interaction effects revealed minimum infection in C_1T_8 (5.69%) and maximum in C_2T_1 (11.25%).

Discussion

In the present study chilli cultivars Rudra and Devnur Dabbi exhibited clear differences in seed storability highlighting the role of genetic makeup in determining seed viability and vigour. Rudra, an improved cultivar maintained higher germination and vigour likely due to stronger antioxidant activity, membrane stability and resistance to oxidative stress which delay ageing. In contrast, Devnur Dabbi a traditional cultivar showed faster deterioration under storage. Similar observations were reported by Kavitha (2007) [14] and Kumar *et al.* (2014) [17], who emphasized that cultivar-specific traits such as seed coat properties, biochemical composition and reserve utilization significantly influence storability and seed quality retention.

Seed germination (%): Over the storage period at tenth month, treatment fungicide combination Trifloxystrobin 25% + Tebuconazole 50% (T_8) recorded 56.25% significantly higher germination percentage over control. The enhanced performance in treated seeds is attributed to the protective action of fungicides, which suppress pathogenic fungi, reduce oxidative stress and stabilize membrane and enzymatic systems. Recent studies confirmed that seed treatments combining fungicides and polymers preserve seed physiology and biochemical function under storage (Moumni *et al.*, 2023; Mishra *et al.*, 2023) [21, 20]. These treatments also effectively mitigate deterioration caused by storage fungi like *Aspergillus* and *Fusarium*, thus extending seed viability and vigour.

Root and Shoot length (cm): Root and shoot length declined progressively during storage, indicating seed deterioration. However, fungicidal treatments effectively minimized losses. Trifloxystrobin 25% + Tebuconazole 50% (T_8) maintained the highest root length (8.04 cm to 6.87 cm) and shoot length (6.82 cm to 5.58 cm) from the second to the tenth month, followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6), as shown in Tables 2 and 3. These treatments were most effective in sustaining seedling vigour under prolonged storage. Similar findings by Singh *et al.* (2021) [28] and Sharma *et al.* (2023) [26] highlighted that appropriate seed treatments improve physiological quality and reduce deterioration during storage.

Seedling vigour indices: Seed deterioration during storage is primarily caused by oxidative stress, where excessive ROS induce lipid peroxidation, generating cytotoxic aldehydes like MDA and HNE that impair mitochondria, reduce ATP and lower seedling vigour (Islavath, 2022) [12]. The fungicide combination Trifloxystrobin 25% + Tebuconazole 50% (T_8) mitigated these effects by suppressing seed-borne pathogens, thereby reducing infection-induced ROS. Trifloxystrobin inhibits fungal respiration, while Tebuconazole blocks ergosterol biosynthesis, preserving membrane integrity and seed metabolism. Treated seeds maintained higher vigour indices (VI-I: 1191-781; VI-II: 2967-1991) compared to untreated seeds. Similar results were reported by Siddartha *et al.* (2017) [27], confirming fungicide coatings enhance vigour and viability.

Seed moisture (%): Seeds are hygroscopic, and their moisture content fluctuates with changes in relative humidity and temperature during storage. In this study, treated seeds particularly with Trifloxystrobin 25% + Tebuconazole 50% (T_8), maintained significantly lower moisture levels (7.77-8.03%) due to fungicide coating, which acted as a partial barrier to hygroscopicity and suppressed fungal growth. This minimized respiration, lipid peroxidation, and microbial metabolism, thereby preserving seed integrity. In contrast, untreated seeds (T_1: 7.83-8.28%) gradually absorbed atmospheric moisture, leading to enhanced microbial activity, lipid peroxidation, and faster deterioration. Similar findings were reported by Kumar *et al.* (2019) [16], highlighting fungicide and packaging benefits.

Electrical Conductivity (µS/cm): Seed deterioration during storage damages cell membranes, leading to solute leakage and reduced seed quality. Electrical conductivity (EC) is therefore a reliable test of seed vigour, as it measures electrolyte leakage from seeds. In the present study, Trifloxystrobin 25% + Tebuconazole 50% (T_8) treated seeds showed significantly lower EC (491.48-774.28 µS/cm), indicating better membrane stability, while untreated control (T_1) recorded the highest EC (560.94-994.25 µS/cm) from the second to the tenth month. These results confirm the role of fungicide treatments in reducing solute leakage and preserving viability, agreeing with Malik (2017) [18] on systemic fungicides maintaining membrane integrity.

Seed Infection (%): Seed infection progressively increased with storage duration due to the proliferation of seed-borne fungi favored by elevated moisture and natural ageing. Pathogens such as *Aspergillus*, *Fusarium*, and *Penicillium* were associated with reduced germination and vigour through reserve depletion and toxin production (Neergaard, 1979; Christensen & Kaufmann, 1969) [23, 6]. Untreated control seeds (T_1) recorded the highest infection (6.03-9.94%), while fungicide treatments significantly minimized infection. Trifloxystrobin 25% + Tebuconazole 50% (T_8) was most effective (5.41-7.56%), owing to the synergistic action of its active ingredients. Trifloxystrobin inhibits mitochondrial respiration, preventing fungal growth, whereas Tebuconazole disrupts ergosterol biosynthesis, impairing cell membrane integrity. This dual mechanism provided protective and systemic action reducing surface-borne fungi like *Aspergillus* and *Penicillium* as well as

internal pathogens such as *Fusarium* (Agarwal & Sinclair, 1997; Kumar *et al.*, 2015) [2, 15]. At the tenth month, treated seeds had 49.42% lower infection compared to control. These findings agree with Jakhar *et al.* (2023) [13], who reported similar benefits in rice.

The interaction between cultivars and treatments revealed that efficacy was cultivar dependent. Rudra (C_1) responded best, with seeds treated using Trifloxystrobin 25% + Tebuconazole 50% (C_1T_8) recording the highest germination, root and shoot length, vigour inde. This was followed by Penflufen 13.28% + Trifloxystrobin 13.28% (C_1T_6). Conversely, untreated Devnur dabbi (C_2T_1) performed poorest across parameters. The superiority of C_1T_8 and C_1T_6 is attributed to the broad-spectrum dual systemic-protective action of fungicides that suppressed pathogens, reduced deterioration and preserved membrane integrity. Similar cultivar-treatment interactions enhancing vigour were also reported by Nagaveni and Lokesh (2018) [22].

Table 1: Effect of fungicide seed treatment on Seed Germination (%) of chilli cultivars during ambient storage

Treatments	Seed Germination (%)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	83.25 (66.43)	77.83 (61.97)	72.13 (58.18)	67.44 (55.27)	60.04 (50.83)
C_2	64.33 (53.44)	59.42 (50.44)	53.75 (47.16)	48.83 (44.32)	44.58 (41.85)
S.Em±	0.072	0.071	0.072	0.074	0.062
CD at 1%	0.279	0.275	0.279	0.287	0.242
Seed treatments (T)					
T_1	70.67 (57.76)	64.33 (53.49)	55.00 (47.93)	45.50 (42.37)	39.17 (38.64)
T_2	72.17 (58.74)	66.33 (54.72)	60.83 (51.38)	56.00 (48.51)	50.00 (45.00)
T_3	73.00 (59.29)	67.17 (55.23)	62.33 (52.28)	57.83 (49.59)	51.33 (45.77)
T_4	73.67 (60.14)	68.33 (55.98)	63.33 (52.88)	59.50 (50.57)	54.50 (47.62)
T_5	74.50 (60.41)	69.33 (56.61)	64.33 (53.47)	60.44 (51.13)	54.00 (47.32)
T_6	75.50 (61.21)	71.33 (57.98)	66.17 (54.64)	62.00 (52.08)	56.00 (48.49)
T_7	73.50 (59.32)	68.17 (55.88)	62.83 (52.56)	59.00 (50.27)	53.17 (46.84)
T_8	77.33 (62.60)	74.00 (59.75)	68.67 (56.20)	64.83 (53.81)	60.33 (51.07)
S.Em±	0.144	0.142	0.144	0.148	0.125
CD at 1%	0.559	0.551	0.558	0.573	0.483

C_1-Rudra C_2-Devnur dabbi
Figures in the parenthesis are arc sine transformed values
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Table 2: Effect of fungicide seed treatment on Root Length (cm) of chilli cultivars during ambient storage

Treatment Interaction	Seed Germination (%)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	80.33 (64.15)	73.33 (58.91)	64.67 (53.53)	55.33 (48.06)	48.00 (43.85)
C_1T_2	82.00 (65.15)	75.33 (60.22)	70.33 (57.00)	65.67 (54.13)	57.33 (49.22)
C_1T_3	82.33 (65.65)	76.00 (60.67)	71.67 (57.84)	67.33 (55.14)	58.33 (49.80)
C_1T_4	83.33 (66.95)	77.33 (61.57)	72.33 (58.27)	68.33 (55.76)	62.33 (52.14)
C_1T_5	83.67 (66.69)	78.33 (62.26)	73.00 (58.69)	69.54 (56.50)	61.00 (51.36)
C_1T_6	84.67 (67.49)	81.33 (64.40)	75.67 (60.44)	71.33 (57.63)	63.33 (52.73)
C_1T_7	83.33 (65.91)	77.33 (61.57)	71.33 (57.63)	67.67 (55.35)	60.67 (51.16)
C_1T_8	86.33 (69.44)	83.67 (66.17)	78.00 (62.03)	74.33 (59.56)	69.33 (56.37)
C_2T_1	61.00 (51.36)	55.33 (48.06)	45.33 (42.32)	35.67 (36.67)	30.33 (33.42)
C_2T_2	62.33 (52.34)	57.33 (49.22)	51.33 (45.76)	46.33 (42.90)	42.67 (40.78)
C_2T_3	63.67 (52.93)	58.33 (49.80)	53.00 (46.72)	48.33 (44.05)	44.33 (41.75)
C_2T_4	64.00 (53.33)	59.33 (50.38)	54.33 (47.49)	50.67 (45.38)	46.67 (43.09)
C_2T_5	65.33 (54.13)	60.33 (50.96)	55.67 (48.25)	51.33 (45.76)	47.00 (43.28)
C_2T_6	66.33 (54.94)	61.33 (51.55)	56.67 (48.83)	52.67 (46.53)	48.67 (44.24)
C_2T_7	63.67 (52.73)	59.00 (50.19)	54.33 (47.49)	50.33 (45.19)	45.67 (42.51)
C_2T_8	68.33 (55.76)	64.33 (53.33)	59.33 (50.38)	55.33 (48.06)	51.33 (45.76)
Mean	73.791	68.623	62.937	58.137	52.312
S.Em ±	0.204	0.201	0.204	0.209	0.176
CD at 1%	0.790	0.779	0.788	0.811	0.683

Table 3: Effect of fungicide seed treatment on Shoot Length (cm) of chilli cultivars during ambient storage

Treatments	Root Length (cm)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	9.99	9.77	9.37	9.02	8.68
C_2	5.68	5.53	5.14	4.81	4.46
S.Em±	0.01	0.01	0.01	0.02	0.02
CD at 1%	0.05	0.05	0.05	0.06	0.06
Seed treatments (T)					
T_1	7.60	7.44	6.99	6.57	6.19
T_2	7.65	7.50	7.17	6.84	6.53
T_3	7.86	7.68	7.25	6.95	6.54
T_4	7.90	7.63	7.27	6.95	6.56
T_5	7.79	7.71	7.30	6.98	6.64
T_6	8.00	7.81	7.39	7.07	6.71
T_7	7.86	7.52	7.17	6.80	6.53
T_8	8.04	7.92	7.50	7.16	6.87
S.Em±	0.02	0.03	0.02	0.03	0.03
CD at 1%	0.10	0.14	0.11	0.15	0.12

C_1-Rudra C_2-Devnur dabbi
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Treatment Interaction	Root Length (cm)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	9.77	9.52	9.03	8.52	8.15
C_1T_2	9.73	9.55	9.19	8.86	8.54
C_1T_3	10.00	9.88	9.43	9.16	8.70
C_1T_4	10.03	9.72	9.36	9.04	8.67
C_1T_5	9.97	9.84	9.43	9.10	8.78
C_1T_6	10.14	9.96	9.53	9.22	8.85
C_1T_7	10.10	9.61	9.30	8.92	8.67
C_1T_8	10.18	10.10	9.67	9.32	9.09
C_2T_1	5.43	5.36	4.95	4.63	4.23
C_2T_2	5.56	5.45	5.15	4.83	4.51
C_2T_3	5.71	5.47	5.07	4.73	4.37
C_2T_4	5.76	5.54	5.17	4.85	4.45
C_2T_5	5.62	5.57	5.18	4.85	4.51
C_2T_6	5.85	5.65	5.24	4.92	4.56
C_2T_7	5.62	5.44	5.03	4.68	4.39
C_2T_8	5.90	5.73	5.33	5.01	4.64
Mean	7.84	7.65	7.25	6.92	6.57
S.Em±	0.04	0.04	0.03	0.04	0.04
CD at 1%	0.14	0.15	0.16	0.17	0.16

Treatments	Shoot Length (cm)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	7.78	7.56	7.23	6.86	6.52
C_2	5.43	5.20	4.84	4.53	4.19
S.Em±	0.01	0.01	0.01	0.01	0.01
CD at 1%	0.04	0.05	0.04	0.05	0.03
Seed treatment (T)					
T_1	6.38	6.16	5.78	5.45	5.08
T_2	6.53	6.33	5.97	5.61	5.28
T_3	6.60	6.38	6.01	5.69	5.36
T_4	6.71	6.49	6.10	5.64	5.30
T_5	6.50	6.28	6.08	5.77	5.47
T_6	6.73	6.50	6.13	5.83	5.47
T_7	6.55	6.33	5.94	5.64	5.28
T_8	6.82	6.58	6.26	5.94	5.58
S.Em±	0.02	0.02	0.02	0.03	0.02
CD at 1%	0.08	0.09	0.07	0.11	0.07

C_1-Rudra C_2-Devnur dabbi
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Treatment Interaction	Shoot length				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	7.53	7.31	6.96	6.63	6.24
C_1T_2	7.74	7.57	7.16	6.74	6.38
C_1T_3	7.79	7.57	7.19	6.87	6.59
C_1T_4	7.89	7.68	7.38	6.75	6.43
C_1T_5	7.68	7.48	7.28	6.97	6.65
C_1T_6	7.91	7.69	7.35	7.05	6.71
C_1T_7	7.64	7.43	7.07	6.74	6.38
C_1T_8	8.03	7.78	7.42	7.12	6.74
C_2T_1	5.22	5.01	4.59	4.27	3.91
C_2T_2	5.33	5.10	4.78	4.48	4.18
C_2T_3	5.41	5.19	4.83	4.51	4.14
C_2T_4	5.53	5.31	4.81	4.52	4.16
C_2T_5	5.32	5.09	4.88	4.57	4.29
C_2T_6	5.54	5.31	4.91	4.61	4.24
C_2T_7	5.45	5.24	4.82	4.54	4.17
C_2T_8	5.60	5.38	5.09	4.75	4.42
Mean	6.60	6.38	6.03	5.70	5.35
S.Em±	0.03	0.03	0.03	0.04	0.02
CD at 1%	0.11	0.13	0.12	0.17	0.09

Table 4: Effect of fungicide seed treatment on Seedling vigour index-I of chilli cultivars during ambient storage

Treatments	Seedling vigour index-I				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	1492	1350	1198	1073	915
C_2	717	638	537	457	387
S.Em±	2.28	1.89	2.00	2.10	1.74
CD at 1%	8.83	7.34	7.73	8.11	6.74
Seed Treatment (T)					
T_1	1026	904	733	578	469
T_2	1060	947	830	728	613
T_3	1092	974	858	763	635
T_4	1122	995	877	777	672
T_5	1103	1000	890	801	677
T_6	1152	1054	926	831	707
T_7	1090	974	851	762	652
T_8	1191	1105	976	881	781
S.Em±	4.56	3.79	3.99	4.19	3.48
CD at 1%	17.66	14.67	15.47	16.23	13.49

C_1-Rudra C_2-Devnur dabbi
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Treatments Interactions	Seedling vigour index-I				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	1401	1234	1034	838	691
C_1T_2	1438	1289	1150	1024	856
C_1T_3	1477	1327	1191	1079	892
C_1T_4	1518	1345	1211	1080	941
C_1T_5	1488	1357	1220	1118	941
C_1T_6	1541	1436	1277	1161	985
C_1T_7	1478	1317	1167	1060	913
C_1T_8	1596	1496	1333	1222	1098
C_2T_1	650	574	433	317	247
C_2T_2	683	605	510	431	371
C_2T_3	708	622	524	447	377
C_2T_4	726	644	542	475	402
C_2T_5	718	643	560	484	414
C_2T_6	763	672	575	502	428
C_2T_7	701	630	535	464	391
C_2T_8	786	715	618	540	465
Mean	1105	994	868	765	651
S.Em±	6.45	5.36	5.65	5.93	4.93
CD at 1%	24.98	20.75	21.87	22.95	19.07

Table 5: Effect of fungicide seed treatment on Seedling vigour index-II of chilli cultivars during ambient storage

Treatments	Seedling vigour index-II				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	3568	3198	2835	2558	2168
C_2	1961	1773	1551	1353	1160
S.Em±	3.91	4.08	4.11	4.02	3.35
CD at 1%	15.15	15.79	15.91	15.56	12.99
Seed treatments (T)					
T_1	2617	2278	1863	1464	1205
T_2	2674	2392	2065	1861	1555
T_3	2713	2433	2170	1939	1599
T_4	2773	2491	2224	2015	1734
T_5	2799	2487	2233	2025	1728
T_6	2854	2636	2351	2133	1822
T_7	2719	2443	2168	1956	1678
T_8	2967	2727	2468	2251	1991
S.Em±	7.82	8.15	8.22	8.03	6.71
CD at 1%	30.30	31.57	31.82	31.11	25.97

C_1-Rudra C_2-Devnur dabbi
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Treatments Interactions	Seedling vigour index-II				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	3399	2955	2470	1995	1680
C_1T_2	3475	3075	2681	2466	2036
C_1T_3	3520	3125	2811	2557	2077
C_1T_4	3605	3198	2878	2613	2245
C_1T_5	3594	3182	2868	2626	2215
C_1T_6	3635	3394	3028	2781	2333
C_1T_7	3511	3173	2781	2520	2180
C_1T_8	3803	3483	3158	2904	2580
C_2T_1	1835	1600	1256	932	730
C_2T_2	1874	1710	1449	1255	1074
C_2T_3	1906	1742	1530	1320	1120
C_2T_4	1941	1785	1571	1417	1222
C_2T_5	2004	1791	1598	1424	1242
C_2T_6	2073	1877	1674	1485	1312
C_2T_7	1928	1712	1556	1391	1177
C_2T_8	2130	1970	1779	1598	1402
Mean	2765	2486	2193	1955	1664
S.Em±	11.06	11.53	11.62	11.36	9.48
CD at 1%	42.85	44.65	45.00	44.00	36.73

Treatments	Seed Moisture (%)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	7.76 (16.17)	7.78 (16.20)	7.84 (16.26)	7.96 (16.39)	8.10 (16.53)
C_2	7.84 (16.26)	7.87 (16.29)	7.92 (16.35)	8.04 (16.47)	8.18 (16.62)
S.Em±	0.0005	0.0004	0.0008	0.0007	0.0007
CD at 1%	0.0019	0.0013	0.0029	0.0025	0.0025
Seed treatments (T)					
T_1	7.832 (16.251)	7.851 (16.271)	7.949 (16.376)	8.106 (16.541)	8.286 (16.730)
T_2	7.809 (16.227)	7.828 (16.247)	7.896 (16.320)	8.030 (16.462)	8.187 (16.626)
T_3	7.802 (16.220)	7.831 (16.250)	7.877 (16.300)	7.994 (16.424)	8.147 (16.584)
T_4	7.791 (16.208)	7.826 (16.245)	7.877 (16.299)	7.988 (16.417)	8.119 (16.555)
T_5	7.799 (16.216)	7.816 (16.234)	7.859 (16.280)	7.983 (16.412)	8.110 (16.545)
T_6	7.784 (16.200)	7.819 (16.238)	7.866 (16.287)	7.953 (16.380)	8.064 (16.497)
T_7	7.792 (16.209)	7.831 (16.250)	7.882 (16.305)	8.015 (16.446)	8.151 (16.588)
T_8	7.775 (16.191)	7.807 (16.225)	7.852 (16.273)	7.931 (16.357)	8.039 (16.471)
S.Em±	0.001	0.001	0.002	0.001	0.001
CD at 1%	0.004	0.003	0.006	0.005	0.005

C_1-Rudra C_2-Devnur dabbi
Figures in the parenthesis are arc sine transformed values
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Table 6: Effect of fungicide seed treatment on Seed moisture (%) of chilli cultivars during ambient storage

Treatments Interactions	Seed Moisture (%)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	7.783 (16.200)	7.781 (16.197)	7.901 (16.325)	8.057 (16.490)	8.242 (16.683)
C_1T_2	7.770 (16.186)	7.780 (16.197)	7.872 (16.294)	8.011 (16.442)	8.162 (16.600)
C_1T_3	7.761 (16.175)	7.791 (16.208)	7.841 (16.261)	7.957 (16.384)	8.103 (16.538)
C_1T_4	7.752 (16.166)	7.781 (16.197)	7.822 (16.241)	7.931 (16.357)	8.064 (16.497)
C_1T_5	7.757 (16.172)	7.772 (16.187)	7.818 (16.237)	7.936 (16.362)	8.069 (16.503)
C_1T_6	7.747 (16.160)	7.786 (16.203)	7.837 (16.257)	7.925 (16.351)	8.038 (16.470)
C_1T_7	7.752 (16.167)	7.791 (16.208)	7.842 (16.262)	7.954 (16.381)	8.084 (16.519)
C_1T_8	7.740 (16.153)	7.771 (16.186)	7.810 (16.228)	7.891 (16.315)	8.001 (16.431)
C_2T_1	7.880 (16.303)	7.921 (16.346)	7.997 (16.426)	8.154 (16.592)	8.331 (16.776)
C_2T_2	7.847 (16.267)	7.875 (16.297)	7.920 (16.346)	8.049 (16.482)	8.211 (16.651)
C_2T_3	7.844 (16.264)	7.870 (16.292)	7.913 (16.338)	8.032 (16.463)	8.191 (16.630)
C_2T_4	7.831 (16.250)	7.871 (16.293)	7.932 (16.358)	8.045 (16.477)	8.174 (16.612)
C_2T_5	7.840 (16.261)	7.860 (16.282)	7.900 (16.324)	8.031 (16.462)	8.150 (16.588)
C_2T_6	7.821 (16.240)	7.852 (16.273)	7.894 (16.317)	7.981 (16.410)	8.090 (16.524)
C_2T_7	7.832 (16.252)	7.870 (16.292)	7.922 (16.347)	8.076 (16.510)	8.217 (16.658)
C_2T_8	7.810 (16.228)	7.843 (16.264)	7.894 (16.317)	7.970 (16.398)	8.077 (16.511)
Mean	7.796	7.824	7.879	7.996	8.134
S.Em±	0.001	0.001	0.002	0.002	0.002
CD at 1%	0.006	0.004	0.009	0.007	0.007

Table 7: Effect of fungicide seed treatment on Electrical conductivity (µS/cm) of chilli cultivars during storage

Treatments	Electrical conductivity (µS/cm)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	383.45	458.31	535.04	614.43	693.05
C_2	659.39	756.24	851.28	946.51	1039.57
S.Em±	1.50	1.71	1.91	1.81	1.66
CD at 1%	5.80	6.63	7.38	7.02	6.43
Seed treatments (T)					
T_1	560.94	668.79	777.24	886.28	994.25
T_2	541.65	635.11	730.44	826.27	920.90
T_3	532.87	624.54	714.21	805.28	882.75
T_4	521.35	609.79	696.70	784.65	872.17
T_5	515.96	597.71	680.62	764.66	850.89
T_6	499.85	577.81	654.97	734.24	814.49
T_7	507.26	584.62	661.30	740.85	820.75
T_8	491.48	559.86	629.81	701.52	774.28
S.Em±	3.00	3.43	3.81	3.63	3.32
CD at 1%	11.61	13.27	14.77	14.05	12.86

C_1-Rudra C_2-Devnur dabbi
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Treatments Interactions	Electrical conductivity (µS/cm)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	411.38	496.68	583.19	670.87	756.40
C_1T_2	397.10	478.03	562.71	648.34	731.60
C_1T_3	392.63	469.49	550.42	632.27	705.23
C_1T_4	385.04	460.18	538.93	619.61	699.45
C_1T_5	379.90	451.33	525.14	601.31	681.69
C_1T_6	366.30	438.82	509.74	584.89	661.50
C_1T_7	373.43	445.23	515.41	591.70	668.32
C_1T_8	361.84	426.72	494.82	566.45	640.19
C_2T_1	710.50	840.90	971.29	1101.70	1232.10
C_2T_2	686.20	792.19	898.17	1004.19	1110.19
C_2T_3	673.11	779.58	878.01	978.29	1060.27
C_2T_4	657.65	759.39	854.47	949.69	1044.90
C_2T_5	652.03	744.09	836.09	928.00	1020.08
C_2T_6	633.40	716.80	800.20	883.59	967.47
C_2T_7	641.09	724.00	807.20	890.00	973.19
C_2T_8	621.12	693.00	764.80	836.59	908.36
Mean	521.42	607.28	693.16	780.47	866.31
S.Em±	4.24	4.84	5.39	5.13	4.69
CD at 1%	16.42	18.76	20.89	19.86	18.18

Table 8: Effect of fungicide seed treatment on Seed infection (%) of chilli cultivars during storage

Treatments	Seed infection (%)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
Cultivars (C)					
C_1	3.63 (10.98)	4.29 (11.94)	5.31 (13.30)	6.11 (14.29)	7.01 (15.33)
C_2	7.59 (16.00)	8.12 (16.55)	8.89 (17.34)	9.69 (18.13)	10.31(18.72)
S.Em±	0.01	0.01	0.02	0.03	0.04
CD at 1%	0.05	0.05	0.09	0.12	0.16
Seed treatments (T)					
T_1	6.03 (14.03)	6.93 (15.12)	8.09 (16.42)	9.01 (17.40)	9.94 (18.34)
T_2	5.76 (13.67)	6.59 (14.72)	7.60 (15.90)	8.38 (16.73)	9.27 (17.65)
T_3	5.67 (13.56)	6.35 (14.43)	7.37 (15.63)	8.18 (16.52)	8.89 (17.27)
T_4	5.60 (13.47)	6.19 (14.22)	6.97 (15.20)	7.90 (16.24)	8.67 (17.06)
T_5	5.44 (13.27)	5.94 (13.93)	6.85 (15.06)	7.78 (16.10)	8.55 (16.94)
T_6	5.43 (13.24)	5.83 (13.78)	6.63 (14.80)	7.11 (15.30)	7.83 (16.11)
T_7	5.57 (13.44)	6.04 (14.06)	7.07 (15.30)	7.84 (16.16)	8.59 (16.97)
T_8	5.41 (13.21)	5.76 (13.70)	6.20 (14.23)	7.04 (15.24)	7.56 (15.84)
S.Em±	0.02	0.03	0.05	0.06	0.08
CD at 1%	0.09	0.11	0.19	0.23	0.32

C_1-Rudra C_2-Devnur dabbi
Seed treatment:
T_1-Control
T_2-Carbendazim 2.0 g
T_3-Propiconazole 25% EC 1.0 mL
T_4-Tebuconazole 2% DS1.0 mL
T_5-Carboxin 37.5% + Thiram 37.5% 2.0 g
T_6-Penflufen 13.28% + Trifloxystrobin 13.28% 1.0 mL
T_7-Captan 70% + Hexaconazole 5% 1.0 mL
T_8-Trifloxystrobin 25%+Tebuconazole 50%WG 2.0

Treatments Interactions	Seed infection (%)				
	Period of storage (months)				
	2 (Nov-24)	4 (Jan-25)	6 (Mar-25)	8 (May-25)	10 (Jul-25)
C_1T_1	4.05 (11.61)	5.01 (12.93)	6.25 (14.48)	7.45 (15.84)	8.63 (17.09)
C_1T_2	3.75 (11.17)	4.68 (12.50)	5.80 (13.94)	6.54 (14.82)	7.52 (15.92)
C_1T_3	3.69 (11.08)	4.40 (12.11)	5.50 (13.57)	6.34 (14.59)	7.25 (15.63)
C_1T_4	3.62 (10.97)	4.22 (11.85)	5.32 (13.34)	6.24 (14.47)	7.13 (15.49)
C_1T_5	3.51 (10.80)	4.05 (11.61)	5.16 (13.13)	6.09 (14.29)	7.08 (15.44)
C_1T_6	3.41 (10.64)	3.93 (11.43)	4.93 (12.83)	5.06 (13.00)	5.81 (13.95)
C_1T_7	3.62 (10.97)	4.16 (11.76)	5.30 (13.31)	6.13 (14.34)	6.97 (15.31)
C_1T_8	3.38 (10.60)	3.87 (11.35)	4.20 (11.83)	5.03 (12.96)	5.69 (13.80)
C_2T_1	8.01 (16.44)	8.85 (17.31)	9.93 (18.37)	10.56 (18.96)	11.25 (19.60)
C_2T_2	7.76 (16.17)	8.50 (16.95)	9.41 (17.86)	10.21 (18.63)	11.02 (19.39)
C_2T_3	7.64 (16.05)	8.30 (16.75)	9.24 (17.70)	10.01 (18.44)	10.52 (18.92)
C_2T_4	7.58 (15.98)	8.16 (16.60)	8.61 (17.06)	9.56 (18.01)	10.20 (18.63)
C_2T_5	7.37 (15.75)	7.83 (16.25)	8.54 (17.00)	9.46 (17.92)	10.01 (18.44)
C_2T_6	7.45 (15.84)	7.72 (16.14)	8.33 (16.77)	9.15 (17.61)	9.84 (18.28)
C_2T_7	7.52 (15.92)	7.92 (16.35)	8.84 (17.30)	9.54 (17.99)	10.20 (18.63)
C_2T_8	7.43 (15.82)	7.65 (16.06)	8.20 (16.64)	9.05 (17.51)	9.42 (17.87)
Mean	5.61	6.20	7.09	7.90	8.65
S.Em±	0.03	0.04	0.07	0.08	0.12
CD at 1%	0.13	0.15	0.27	0.33	0.46

Conclusion

The study concludes that seed quality and storability in chilli are strongly influenced by both cultivar characteristics and fungicide treatments. Rudra, being an improved cultivar exhibited superior storability, whereas Devanur Dabbi deteriorated rapidly under storage. Among fungicides, the combination Trifloxystrobin 25% + Tebuconazole 50% proved most effective, significantly reducing seed infection, oxidative damage and membrane leakage, thereby delaying deterioration and ensuring higher seed viability. The findings emphasize that adopting effective seed treatments along with proper cultivar selection can enhance seed longevity, benefiting both farmers and the seed industry.

Summary

The present study evaluated the variability in seed quality among eight chilli cultivars and the impact of fungicide seed treatments on storability under ambient conditions. Among the cultivars, Rudra consistently outperformed others with higher germination, vigour, lower electrical conductivity, reduced seed infection and better storability, while Devanur Dabbi showed poor performance. Fungicide treatments, especially Trifloxystrobin 25% + Tebuconazole 50% (T8), followed by Penflufen 13.28% + Trifloxystrobin 13.28% (T_6), were highly effective in maintaining seed quality attributes such as germination, root and shoot growth, vigour indices and membrane stability. Treated seeds

showed reduced moisture uptake, lower electrical conductivity, and suppressed seed-borne infections compared to untreated controls. The results highlight the synergistic effect of cultivar potential and fungicide treatments in prolonging seed viability and vigour.

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