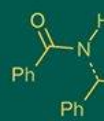


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Balancing dormancy break and storability: Polyphenols, leaching duration and storage behaviour in coriander seeds

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Abstract

Coriander seed production is constrained by poor, uneven germination in the field and rapid loss of seed quality during storage, problems that are closely linked to the high polyphenol content of the schizocarp. This study evaluated how these polyphenols, and their removal by leaching, influence germination and storability in coriander (cv. CO 5). Total phenolic content (TPC) determined using the Folin-Ciocalteu method. Seeds were leached in water for 6, 12, 18, 24 or 30 h (1:10 seed-to-water ratio), dried to original moisture and assessed for germination, seedling growth, vigour index, dehydrogenase and TPC. Control and leached seeds were then stored for 12 months under ambient conditions and sampled monthly for physiological, biochemical and health parameters. Fresh seeds contained 8.24 mg GAE g⁻¹ TPC. Leaching for 24 h gave the best initial performance, increasing germination to about 79%, vigour index to 1876, enzyme activities, and reducing TPC to ~4.5 mg GAE g⁻¹. During storage, however, 24-30 h leached seeds deteriorated faster than the control, showing higher electrical conductivity, greater enzyme decline and stronger phenolic depletion, while untreated mericarps after-ripened and retained relatively higher germination at 12 months. These results indicate that coriander seed polyphenols act both as germination inhibitors and as an antioxidant reserve; 24 h leaching is optimal for short-term, pre-sowing enhancement, whereas un-leached seeds are preferable for long-term storage.

Keywords: Coriander, seed leaching, seed enhancement

Introduction

Coriandrum sativum L., an annual herb belonging to the Apiaceae family, serves as a cornerstone of the global spice trade, valued for its dual utility as a fresh condiment and a primary source of bioactive secondary metabolites for the pharmaceutical and nutraceutical sectors [1]. As of 2024, the global market for anise, badian, fennel, and coriander reached 2.8 million tons with a valuation of \$6.8 billion, with India dominating approximately 66% of global production and 56% of total consumption [2]. Within the Indian national agricultural framework, the spice sector contributes significantly to the Gross Value Added (GVA), which was estimated at 17.7% for the 2023-24 fiscal year [3]. Despite this economic prowess, coriander cultivation is frequently disrupted by inherent physiological constraints, specifically low and non-uniform seed germination rates that hinder predictable field establishment and yield [4].

The failure of coriander seeds-technically dry schizocarps comprising two mericarps-to germinate uniformly is largely attributed to a state of physiological dormancy [5]. This dormancy is regulated by a complex matrix of endogenous chemical inhibitors present within the pericarp and seed coat [4]. These inhibitors, particularly 2-methoxy-4-vinylphenol (MVP), have been documented to suppress the activity of alpha-amylase, the critical enzyme required for starch mobilization during the early stages of germination [6]. In high-yielding varieties of coriander (*Coriandrum sativum* L.), total phenolic content has been reported in the range of approximately 12-16 mg GAE g⁻¹, which may act as a biochemical barrier to moisture imbibition and metabolic activation during seed germination [7].

To overcome these constraints, seed leaching has emerged as a fundamental pre-sowing intervention to wash off water-soluble inhibitors from the seed coat.

However, the standardization of leaching duration is a critical technological requirement; insufficient leaching fails to disrupt the dormancy cycle, while excessive hydration can trigger cellular injury or the premature depletion of essential stimulatory metabolites. Recent studies have identified a 24-hour leaching duration as the optimal standard for maximizing germination and seedling vigor in coriander [4].

Furthermore, while coriander seeds are classified as "orthodox" (desiccation-tolerant), they remain highly susceptible to biochemical deterioration during ambient storage, particularly in tropical regions characterized by high temperatures and relative humidity [8]. The deterioration process, or seed aging, is characterized by a loss of membrane integrity due to lipid peroxidation, the accumulation of reactive oxygen species (ROS), and a concomitant decline in the activity of vital enzymes such as dehydrogenase and catalase [9]. While the removal of inhibitors through leaching improves initial germination, the reduction in the "antioxidant reserve"-composed largely of the same polyphenols that inhibit germination-may accelerate the rate of physiological decline during storage [10, 11].

Considering these multifaceted challenges, the present study was undertaken to provide a comprehensive framework for optimizing coriander seed quality. The investigation followed three primary experimental objectives: The assessment of physical, physiological, and biochemical changes in control and leached seeds over a 12-month ambient storage period.

Materials and Methods

Seeds of coriander variety CO 5 was obtained from the Department of Spices and Plantation Crops, Horticultural College and Research Institute, Tamil Nadu Agricultural University, Coimbatore and used as base materials for the study during January 2025 to December 2025.

Seed Leaching

To establish a standard leaching protocol, fresh coriander seeds (mericarp CO 5) were placed in cloth bags and submerged in water at a 1:10 seed-to-solution ratio for intervals of 6, 12, 18, 24, and 30 hours. Every 6 hours, the water was drained and replaced with fresh water. Following the treatment, the seeds were shade-dried for 24 hours until they returned to their original moisture levels.

Assessment of physical, physiological and biochemical changes in control and leached seeds of coriander during storage

To evaluate the preservation quality of coriander seeds, fresh CO 5 variety seeds (serving as a control group) along with seeds subjected to various leaching intervals were stored in cloth bags under ambient environmental conditions. At the beginning of the storage period, both control and leached seeds underwent initial testing for physiological and biochemical parameters. Subsequently, seed samples were collected from every treatment group at monthly intervals throughout the storage duration to monitor changes in these specific physiological and biochemical characteristics.

Germination test

Germination trials were carried out in a controlled setting at

25±1 °C with 95±2% relative humidity. Using 400 mericarp seeds placed in roll towels, the study followed International Seed Testing Association protocols [12], which mandate a 21-day period for coriander before assessing physiological metrics.

Germination percentage

Germination % of coriander seeds were calculated using the formula:

Germination% = (Number of normal seedlings/Total number of seeds sown) × 100

Root length and Shoot length

In each replication, ten normal seedlings were chosen at random to determine root and shoot lengths. Root length was measured from the hypocotyl base to the primary root tip using a scale, with the average recorded in centimeters. Subsequently, the same seedlings were measured from the hypocotyl base to the tip of the primary leaves to calculate the mean shoot length in centimeters.

Dry matter

After the seedlings were measured, 10 representative samples were placed in a hot air oven at 80 °C for 24 hours to calculate their dry weight.

Vigour index

Following the procedure described by Abdul-Baki and Anderson [13], the seedling vigour index was calculated as follows:

Vigour index I = Germination percentage × Total seedling length (cm)

Determination of dehydrogenase activity

Mericarp coriander seeds were preconditioned by soaking in water for 6 h. Seeds were bisected longitudinally to expose the embryo. These sections were then immersed in a 0.1% solution of 2, 3, 5-triphenyl tetrazolium chloride and incubated in the dark at 40 °C for six hours for staining. Once stained, the seeds were rinsed with distilled water and placed into 10 mL of 2-methoxy ethanol within an airtight 25 mL conical flask, which was kept in an incubator overnight in total darkness to extract the red formazan. The coloured solution was decanted and the color intensity was measured in an ELICO UV-VIS spectrophotometer (Model SL-159) at 470 nm, with methyl cellosolve serving as the blank. The measured optical density was then recorded as the level of dehydrogenase activity [14].

Determination of total phenols

Coriander seeds were grinded using a pestle and mortar with a tenfold volume of 80% ethanol. Following homogenization, the mixture was centrifuged at 3000 rpm for 10 minutes to collect the supernatant. A 1 mL aliquot of this supernatant was diluted to 3 mL with distilled water, then combined with 0.5 mL of Folin-Ciocalteu reagent. After a 3-minute incubation, 2 mL of 20% Na₂CO₃ solution was incorporated and thoroughly mixed. The resulting sample was heated in a boiling water bath for 1 minute, allowed to cool, and its absorbance was measured at 650 nm using a UV-VIS spectrophotometer. Total phenol concentration was subsequently determined via a standard curve, with results reported as the mean value in mg GAE/g [15].

Statistical analysis

The laboratory study was organized using a Completely Randomized Design (CRD), with results presented as the mean from four replicates. Statistical analysis was performed using AGRES software, employing an analysis of variance (ANOVA) at a $P < 0.05$ significance level. To distinguish between treatment means, Duncan's Multiple Range Test (DMRT) was applied.

Results and Discussion

The 12-month storage study under ambient conditions showed a clear balance between short-term improvement and long-term storage life. At the initial evaluation (P_0), seeds leached for 24 h (T_5) were clearly best treatment: germination was 79% (Table 2), speed of germination of 13.475 (Table 1), dry matter of 0.0587g (Table 6), and vigour index of 1876 (Table 7). These data confirm that removing inhibitory compounds is very effective when seeds are used soon after treatment.

However, this advantage reduced more quickly over time in leached seeds than in the control.

By 12 months (P_{12}), T_5 germination had fallen to about 65%, while the control (T_1) increased from 63% at P_0 to 68% at P_{12} (Table 2), creating a “leaching-longevity paradox” where the best lot at sowing did not have the best final survival. The behaviour of the control is consistent with after-ripening, in which natural inhibitors slowly break down during dry storage, allowing dormant seeds to gradually become able to germinate [16, 17].

In contrast, leached seeds can be seen as “biochemically exposed”: removing much of the phenolic antioxidant layer and subjecting seeds to a hydration-drying cycle likely made them more vulnerable to reactive oxygen species (ROS), lipid peroxidation and membrane injury during storage [8, 18]. This view agrees with seed-ageing models that point to antioxidant loss and ROS build-up as major causes of declining vigour [19, 20].

Measurements of electrical conductivity (EC), dehydrogenase activity and TPC during storage helped to explain these patterns. EC, which reflects leakage of electrolytes from damaged cell membranes, increased with both longer leaching and longer storage: the 30-h treatment (T_6) showed the highest mean EC (0.80 dS m^{-1}), while the control remained lowest (0.52 dS m^{-1}), indicating more

severe membrane damage in heavily leached seeds. Within T_5 , EC increased from 0.623 dS m^{-1} at P_0 to much higher values at P_{12} (Table 5), while dehydrogenase activity dropped from 0.412 to 0.315 OD; the control changed more slowly, from 0.314 to 0.340 OD over the same period (Table 6).

TPC showed a similar trend: in T_5 seeds it decreased from $4.53 \text{ mg GAE g}^{-1}$ at P_0 to about $3.00 \text{ mg GAE g}^{-1}$ at P_{12} , while in the control it fell only from 8.24 to about $6.70 \text{ mg GAE g}^{-1}$ (Table 7). This gradual loss of phenolic compounds supports their role in neutralizing ROS and protecting membranes during storage [21, 22]. Taken together, the rise in EC, the fall in dehydrogenase and α -amylase activities, and the steady decrease in TPC form a consistent biochemical picture of faster ageing in leached seeds, especially when leaching is too long.

Seed health observations showed disease incidence increased with time. By P_{12} , disease incidence was about 15.9% in the 24-h leached seeds (T_5) compared with 14.3% in the control (Table 8), suggesting that partial removal of antimicrobial volatiles such as linalool and some phenolic defences during leaching may slightly lower resistance to seed-borne fungi during long storage [1, 23].

When all storage times are averaged, 24-h leached seeds (T_5) still show the best overall performance, with the highest mean speed of germination (12.74) (Table 1), germination (72.5%) (Table 2), vigour index [1676] (Table 4), dehydrogenase activity (0.37 OD) (Table 6). At the same time, the slightly higher final germination of the control at P_{12} highlights the value of the intact, phenolic-rich seed coat for long-term survival, even though it causes lower initial field emergence.

Overall, these results show that polyphenols in coriander seeds have two roles: at high levels they maintain dormancy and restrict α -amylase, but at moderate levels they act as important antioxidants that slow ageing and disease development during storage. For practical seed handling, leaching for 24 h is the best pre-sowing treatment for coriander cv. CO 5 when seeds will be planted soon and rapid, uniform emergence is the main goal, whereas un-leached mericarps are better for storage periods longer than about 9-12 months, when maintaining viability is more important than maximum initial vigour [1, 4, 24].

Table 1: Effect of duration of seed leaching on the speed of germination in coriander var. CO 5 during storage.

Seed Treatments (T)	Period of storage (P) (Months)													
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	Mean
T ₁ -Control (Mericarp)	10.696	10.696	10.700	10.750	10.775	10.800	10.850	10.900	10.950	10.950	10.956	11.250	11.450	10.902
T ₂ -Seed leaching in standing water for 6 hours	10.913	10.913	10.900	10.880	10.850	10.820	10.780	10.700	10.650	10.600	10.550	10.500	10.450	10.731
T ₃ -Seed leaching in standing water for 12 hours	11.312	11.312	11.300	11.250	11.200	11.150	11.100	11.050	10.950	10.750	10.650	10.500	10.321	10.988
T ₄ -Seed leaching in standing water for 18 hours	12.121	12.100	12.050	12.000	11.750	11.501	11.200	11.100	10.890	10.650	10.400	10.200	10.050	11.232
T ₅ -Seed leaching in standing water for 24 hours	13.475	13.450	13.400	13.300	13.100	13.000	12.800	12.700	12.550	12.200	12.100	11.900	11.750	12.748
T ₆ -Seed leaching in standing water for 30 hours	13.340	13.300	13.250	13.150	13.000	12.800	12.650	12.500	12.200	12.050	11.900	11.750	11.400	12.561
Mean	11.976	11.962	11.933	11.888	11.779	11.678	11.563	11.492	11.365	11.200	11.093	11.017	10.903	11.527
	T				P				T x P					
SEd	0.071				0.105				0.257					
CD (P = 0.05)	0.141				0.207				0.507					

Seed storage period				
P ₀ -Initial	P ₃ -3 MAS	P ₆ -6 MAS	P ₉ -9 MAS	P ₁₂ -12 MAS
P ₁ -1 MAS	P ₄ -4 MAS	P ₇ -7 MAS	P ₁₀ -10 MAS	
P ₂ -2 MAS	P ₅ -5 MAS	P ₈ -8 MAS	P ₁₁ -11 MAS	

Table 3: Effect of duration of seed leaching on dry matter production (g/10 seedlings) in coriander var. CO 5 during storage.

Seed Treatments (T)	Period of storage (P) (Months)													
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	Mean
T ₁ -Control (Mericaip)	0.0400	0.0400	0.0405	0.0410	0.0415	0.0420	0.0425	0.0430	0.0435	0.0435	0.0440	0.0450	0.0460	0.042
T ₂ -Seed leaching in standing water for 6 hours	0.0412	0.0412	0.0410	0.0408	0.0405	0.0400	0.0395	0.0390	0.0385	0.0380	0.0375	0.0370	0.0365	0.039
T ₃ -Seed leaching in standing water for 12 hours	0.0429	0.0428	0.0425	0.0420	0.0415	0.0410	0.0405	0.0400	0.0392	0.0385	0.0378	0.0370	0.0362	0.040
T ₄ -Seed leaching in standing water for 18 hours	0.0459	0.0457	0.0452	0.0445	0.0435	0.0428	0.0420	0.0412	0.0402	0.0392	0.0382	0.0372	0.0352	0.042
T ₅ -Seed leaching in standing water for 24 hours	0.0587	0.0585	0.0580	0.0570	0.0555	0.0540	0.0525	0.0510	0.0495	0.0480	0.0465	0.0450	0.0435	0.052
T ₆ -Seed leaching in standing water for 30 hours	0.0565	0.0562	0.0555	0.0545	0.0530	0.0515	0.0500	0.0485	0.0470	0.0455	0.0440	0.0425	0.0410	0.050
Mean	0.048	0.047	0.047	0.047	0.046	0.045	0.045	0.044	0.043	0.042	0.041	0.041	0.040	0.044
	T				P				T x P					
SEd	0				0				0.001					
CD (P = 0.05)	0				0.001				0.002					

Seed storage period P ₀ -Initial P ₁ -1 MAS P ₂ -2 MAS	P ₃ -3 MAS P ₄ -4 MAS P ₅ -5 MAS	P ₆ -6 MAS P ₇ -7 MAS P ₈ -8 MAS	P ₉ -9 MAS P ₁₀ -10 MAS P ₁₁ -11 MAS	P ₁₂ -12 MAS
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Table 4: Effect of duration of seed leaching on vigour index in coriander var. CO 5 during storage.

Seed Treatments (T)	Period of storage (P) (Months)													
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	Mean
T ₁ -Control (Mericaip)	1068	1068	1072	1080	1085	1090	1100	1110	1120	1120	1130	1150	1180	1106
T ₂ -Seed leaching in standing water for 6 hours	1075	1075	1070	1060	1050	1040	1030	1015	1000	980	960	940	920	1017
T ₃ -Seed leaching in standing water for 12 hours	1185	1185	1175	1155	1145	1130	1115	1100	1065	1050	1010	980	980	1098
T ₄ -Seed leaching in standing water for 18 hours	1452	1445	1430	1400	1360	1330	1300	1270	1230	1190	1150	1110	1070	1287
T ₅ -Seed leaching in standing water for 24 hours	1876	1865	1850	1820	1780	1740	1700	1660	1600	1550	1500	1450	1400	1676
T ₆ -Seed leaching in standing water for 30 hours	1854	1840	1820	1790	1750	1700	1660	1620	1560	1500	1450	1400	1350	1638
Mean	1418	1413	1403	1384	1362	1338	1318	1296	1263	1232	1200	1172	1150	1304
	T				P				T x P					
SEd	7.642				11.249				27.553					
CD (P = 0.05)	15.095				22.219				54.426					

Seed storage period P ₀ -Initial P ₁ -1 MAS P ₂ -2 MAS	P ₃ -3 MAS P ₄ -4 MAS P ₅ -5 MAS	P ₆ -6 MAS P ₇ -7 MAS P ₈ -8 MAS	P ₉ -9 MAS P ₁₀ -10 MAS P ₁₁ -11 MAS	P ₁₂ -12 MAS
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Table 5: Effect of duration of seed leaching on Electrical conductivity (dSm⁻¹) in coriander var. CO 5 during storage.

Seed Treatments (T)	Period of storage (P) (Months)													
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	Mean
T ₁ -Control (Mericaip)	0.427	0.427	0.435	0.445	0.460	0.480	0.500	0.525	0.550	0.575	0.600	0.630	0.660	0.517
T ₂ -Seed leaching in standing water for 6 hours	0.475	0.475	0.480	0.490	0.505	0.520	0.540	0.565	0.590	0.615	0.640	0.665	0.690	0.558
T ₃ -Seed leaching in standing water for 12 hours	0.526	0.526	0.530	0.540	0.555	0.570	0.590	0.615	0.640	0.665	0.690	0.715	0.740	0.608
T ₄ -Seed leaching in standing water for 18 hours	0.575	0.575	0.580	0.590	0.605	0.620	0.640	0.665	0.690	0.715	0.740	0.765	0.790	0.658
T ₅ -Seed leaching in standing water for 24 hours	0.623	0.623	0.630	0.640	0.655	0.670	0.690	0.715	0.740	0.765	0.790	0.815	0.840	0.707
T ₆ -Seed leaching in standing water for 30 hours	0.698	0.698	0.705	0.720	0.740	0.760	0.785	0.810	0.835	0.860	0.885	0.910	0.940	0.796
Mean	0.554	0.554	0.560	0.571	0.587	0.603	0.624	0.649	0.674	0.699	0.724	0.750	0.777	0.640
	T				P				T x P					
SEd	0.004				0.006				0.014					
CD (P = 0.05)	0.008				0.011				2.663					

Seed storage period P ₀ -Initial P ₁ -1 MAS P ₂ -2 MAS	P ₃ -3 MAS P ₄ -4 MAS P ₅ -5 MAS	P ₆ -6 MAS P ₇ -7 MAS P ₈ -8 MAS	P ₉ -9 MAS P ₁₀ -10 MAS P ₁₁ -11 MAS	P ₁₂ -12 MAS
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Table 6: Effect of duration of seed leaching on Dehydrogenase (OD value) in coriander var. CO 5 during storage.

Seed Treatments (T)	Period of storage (P) (Months)													
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	Mean
T ₁ -Control (Mericaip)	0.318	0.314	0.316	0.318	0.320	0.322	0.324	0.326	0.328	0.328	0.330	0.335	0.340	0.325
T ₂ -Seed leaching in standing water for 6 hours	0.340	0.338	0.336	0.334	0.332	0.330	0.328	0.325	0.322	0.318	0.315	0.312	0.308	0.326
T ₃ -Seed leaching in standing water for 12 hours	0.350	0.345	0.343	0.340	0.337	0.334	0.330	0.326	0.320	0.315	0.310	0.305	0.300	0.327
T ₄ -Seed leaching in standing water for 18 hours	0.372	0.362	0.360	0.355	0.350	0.345	0.340	0.335	0.328	0.320	0.312	0.305	0.298	0.337
T ₅ -Seed leaching in standing water for 24 hours	0.416	0.410	0.405	0.398	0.390	0.382	0.374	0.365	0.355	0.345	0.335	0.325	0.315	0.370
T ₆ -Seed leaching in standing water for 30 hours	0.409	0.408	0.402	0.395	0.385	0.375	0.365	0.355	0.345	0.335	0.325	0.315	0.305	0.363
Mean	0.367	0.363	0.360	0.357	0.352	0.348	0.343	0.339	0.333	0.327	0.321	0.316	0.311	0.341
	T				P				T x P					
SEd	0.002				0.003				0.008					
CD (P = 0.05)	0.004				0.007				0.016					

Seed storage period				
P ₀ -Initial	P ₃ -3 MAS	P ₆ -6 MAS	P ₉ -9 MAS	P ₁₂ -12 MAS
P ₁ -1 MAS	P ₄ -4 MAS	P ₇ -7 MAS	P ₁₀ -10 MAS	
P ₂ -2 MAS	P ₅ -5 MAS	P ₈ -8 MAS	P ₁₁ -11 MAS	

Table 7: Effect of duration of seed leaching on Total Polyphenol content (mg GAE/g) in coriander var. CO 5 during storage.

Seed Treatments (T)	Period of storage (P) (Months)													
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	Mean
T ₁ -Control (Mericaip)	8.26	8.20	8.15	8.05	7.90	7.75	7.60	7.45	7.30	7.15	7.00	6.85	6.70	7.566
T ₂ -Seed leaching in standing water for 6 hours	6.45	6.35	6.30	6.20	6.05	5.90	5.75	5.60	5.45	5.30	5.15	5.00	4.85	5.719
T ₃ -Seed leaching in standing water for 12 hours	5.59	5.55	5.50	5.40	5.25	5.10	4.95	4.80	4.65	4.50	4.35	4.20	4.05	4.915
T ₄ -Seed leaching in standing water for 18 hours	5.00	4.95	4.90	4.80	4.65	4.50	4.35	4.20	4.05	3.90	3.75	3.60	3.45	4.315
T ₅ -Seed leaching in standing water for 24 hours	4.58	4.50	4.45	4.35	4.20	4.05	3.90	3.75	3.60	3.45	3.30	3.15	3.00	3.868
T ₆ -Seed leaching in standing water for 30 hours	4.00	3.92	3.88	3.78	3.65	3.50	3.35	3.20	3.05	2.90	2.75	2.60	2.45	3.310
Mean	5.647	5.578	5.530	5.430	5.283	5.133	4.983	4.833	4.683	4.533	4.383	4.233	4.083	4.948
	T				P				T x P					
SEd	0.031				0.045				0.111					
CD (P = 0.05)	0.061				0.089				2.741					

Seed storage period				
P ₀ -Initial	P ₃ -3 MAS	P ₆ -6 MAS	P ₉ -9 MAS	P ₁₂ -12 MAS
P ₁ -1 MAS	P ₄ -4 MAS	P ₇ -7 MAS	P ₁₀ -10 MAS	
P ₂ -2 MAS	P ₅ -5 MAS	P ₈ -8 MAS	P ₁₁ -11 MAS	

Table 8: Effect of duration of seed leaching on Disease Infestation (%) in coriander var. CO 5 during storage.

Seed Treatments (T)	Period of storage (P) (Months)													
	P ₀	P ₁	P ₂	P ₃	P ₄	P ₅	P ₆	P ₇	P ₈	P ₉	P ₁₀	P ₁₁	P ₁₂	Mean
T ₁ -Control (Mericaip)	11.7	11.7	12.0	12.4	12.8	13.2	13.6	13.8	13.8	14.0	14.1	14.2	14.3	13.200
T ₂ -Seed leaching in standing water for 6 hours	11.9	11.9	12.2	12.6	13.0	13.4	13.8	14.0	14.1	14.2	14.4	14.6	14.7	13.446
T ₃ -Seed leaching in standing water for 12 hours	12.1	12.1	12.4	12.8	13.2	13.6	14.0	14.5	14.7	14.9	15.2	15.2	15.3	13.846
T ₄ -Seed leaching in standing water for 18 hours	12.3	12.3	12.7	13.1	13.5	14.8	14.8	14.9	15.01	15.2	15.3	15.5	15.5	14.224
T ₅ -Seed leaching in standing water for 24 hours	12.5	12.5	12.9	13.3	13.8	14.9	15.1	15.2	15.3	15.5	15.7	15.9	15.9	14.500
T ₆ -Seed leaching in standing water for 30 hours	13.0	13.0	13.4	13.9	14.4	15.1	15.3	15.6	15.9	16.1	16.3	16.6	16.6	15.015
Mean	12.250	12.250	12.600	13.017	13.450	14.167	14.433	14.667	14.802	14.983	15.167	15.333	15.383	14.038
	T				P				T x P					
SEd	0.08				0.117				0.287					
CD (P = 0.05)	0.157				0.231				2.504					

Seed storage period				
P ₀ -Initial	P ₃ -3 MAS	P ₆ -6 MAS	P ₉ -9 MAS	P ₁₂ -12 MAS
P ₁ -1 MAS	P ₄ -4 MAS	P ₇ -7 MAS	P ₁₀ -10 MAS	
P ₂ -2 MAS	P ₅ -5 MAS	P ₈ -8 MAS	P ₁₁ -11 MAS	

Conclusion

The present study shows that coriander seeds (cv. CO 5) contain both germination-promoting and inhibitory compounds, with high polyphenol levels playing a key role in dormancy and storage behaviour. Leaching in water for

24 hours lowered polyphenol content, increased dehydrogenase and α -amylase activity, and gave maximum germination, seedling growth and vigour, making this the best pre-sowing treatment for immediate planting. Over 12 months of ambient storage, all seed lots deteriorated, but

leached seeds—especially those leached for 24-30 hours—aged faster than the control, as shown by higher electrical conductivity, reduced enzyme activity and greater polyphenol loss. Although more dormant at first, untreated mericarps after-ripened and kept better germination at the end of storage, confirming that polyphenols both delay germination at high levels and protect viability at moderate levels; therefore, 24-hour leaching suits short-term use, while un-leached seeds are preferable for long-term storage.

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