

Improvement in Storage by Halogen Mixture and Polylined Gunny Bag in Rice

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On account of the biological activities taking place in seed during storage, the seed deteriorates in quality resulting in impairment of germination and vigour. The factors responsible for deterioration are many. Seed viability in storage is determined not only by the period of storage but also by the type of container used, quality of seed at the beginning of storage, storage environment and seed treatment, if any. Chandrasenan Nair [1] found that the halogenated rice seeds stored in gunny bag withstood deterioration and registered high vigour and viability besides, offering protection against insect infestation and pathogen infection. Singh [2] observed that seeds of rice IR 58025 A stored in polylined bags gave higher germination compared to seeds stored in gunny or cloth bags after 12 months of storage. Therefore, an investigation was carried out to determine the efficacious seed treatment and storage container for storing seed under ambient conditions in three rice varieties viz., ADT 38, CO 43 and CO 46.

The experiment was conducted at the Department of Seed Science and Technology, Tamil Nadu Agricultural University, Coimbatore. Freshly harvested seeds of three rice varieties were collected during February 1998. The seeds were dried to 10.2 % moisture content and treated with two chemicals and stored in two containers.

Varieties	Treatments
V ₁ - ADT 38	T ₀ - Control
V ₂ - CO 43	T ₁ - Halogen mixture @ 5 gm kg ⁻¹ dry dressing
V ₃ - CO 46	T ₂ - Thiram @ 2 gm kg ⁻¹ + Carbaryl @ 200 mg kg ⁻¹

The halogen mixture was prepared by mixing equal quantity of calcium oxychloride and calcium carbonate in a closed container, allowed to impregnate for five days and then used for treating seeds.

Containers

- C₁ - Cloth bag
- C₂ - Polylined gunny bag

Seed samples were drawn and evaluated at six monthly intervals upto two years (PO, P1, P2, P3, P4) for moisture content and germination. A total number of 4x400 seeds were germinated in paper medium and per cent germination was evaluated after 14 days of seeding. The data were subjected to statistical analysis [3].

Among the seed treatments, halogen mixture was the best in maintaining seed germination in all the three varieties. This treatment recorded 63 per cent germination after two years of storage as against 52 per cent of untreated control (Table 1). The minimum seed certification standards of 80 %

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Table 1. Seed germination (%) as affected with treatments and containers during storage in rice varieties (Values in paranthesis indicate arcsine values)

Storage period (month)	ADT-38										CO-43										CO-46										
	Cloth bag					Polylined bag					Cloth bag					Polylined bag					Cloth bag					Polylined bag					Grand mean
	T ₀	T ₁	T ₂	Mean	T ₀	T ₁	T ₂	Mean	T ₀	T ₁	T ₂	Mean	T ₀	T ₁	T ₂	Mean	T ₀	T ₁	T ₂	Mean	T ₀	T ₁	T ₂	Mean	T ₀	T ₁	T ₂	Mean			
0	90	90	90	90	90	90	90	90	96	96	96	96	96	96	96	96	92	92	92	92	92	92	92	92	92	92	92	92	93		
	(71.6)	(71.6)	(71.6)	(71.6)	(71.6)	(71.6)	(71.6)	(71.6)	(78.7)	(78.7)	(78.7)	(78.7)	(78.7)	(78.7)	(78.7)	(78.7)	(73.7)	(73.7)	(73.7)	(73.7)	(73.7)	(73.7)	(73.7)	(73.7)	(73.7)	(73.7)	(73.7)	(74.7)			
6	83	88	86	86	84	89	87	87	90	92	89	91	84	89	88	87	84	90	89	88	87	84	90	89	88	88	88	88			
	(65.7)	(69.4)	(68.1)	(67.7)	(66.5)	(71.2)	(69.1)	(68.9)	(71.9)	(74.0)	(71.2)	(72.4)	(72.8)	(74.0)	(71.0)	(72.7)	(66.6)	(71.0)	(70.4)	(69.3)	(66.6)	(71.1)	(71.1)	(71.1)	(69.8)	(70.1)					
12	82	84	83	83	83	85	84	84	83	88	86	86	83	90	87	87	81	84	82	82	83	86	83	84	84	84	84	84			
	(65.0)	(66.6)	(65.9)	(65.8)	(65.7)	(67.4)	(66.6)	(66.6)	(65.8)	(70.1)	(68.2)	(68.0)	(65.7)	(71.9)	(69.1)	(68.9)	(64.2)	(66.5)	(65.0)	(65.2)	(65.7)	(68.2)	(65.7)	(66.6)	(66.8)						
18	73	79	76	76	75	84	79	79	77	84	81	81	79	90	86	85	74	77	75	75	80	84	82	82	80	80	80	80			
	(58.7)	(63.0)	(60.7)	(60.8)	(60.1)	(66.5)	(62.8)	(63.1)	(61.4)	(66.6)	(64.2)	(64.1)	(62.8)	(71.7)	(68.3)	(67.6)	(59.4)	(61.4)	(60.0)	(60.3)	(63.5)	(66.5)	(65.0)	(65.0)	(63.5)						
24	41	55	53	50	51	60	56	56	55	74	70	66	60	82	79	74	45	53	47	48	52	55	47	51	58	58	58	58			
	(39.8)	(47.9)	(46.7)	(44.8)	(45.6)	(50.8)	(48.5)	(48.3)	(47.9)	(59.4)	(56.8)	(54.7)	(50.8)	(64.9)	(62.8)	(59.5)	(42.1)	(46.7)	(43.3)	(44.0)	(46.1)	(47.9)	(43.3)	(45.8)	(49.5)						
Mean	74	79	78	77	77	82	79	79	80	87	84	84	82	90	87	86	75	79	77	77	78	81	79	79	79	79	79	79			
	(60.2)	(63.7)	(62.6)	(62.1)	(61.9)	(65.5)	(63.7)	(63.8)	(65.1)	(69.8)	(67.8)	(67.6)	(66.2)	(72.3)	(70.0)	(72.8)	(61.2)	(63.9)	(62.5)	(62.5)	(63.1)	(65.6)	(63.8)	(64.2)							
CD (P=0.05)	T	V	C	P	T	V	C	P	TP	VC	VP	CP	TVC	TVP	TCP	VCP	TVCP														
	0.77	0.77	0.63	0.99	33	NS	1.72	1.41	1.72	NS	1.72	1.41	NS	NS	2.98	NS	NS														

T₀=Control; T₁=Halogen mixture; T₂=Thiram+Carbaryl

germination was maintained upto 18 months when the seeds were treated with halogen mixture and stored in polylined gunny bag. The efficacy of halogen mixture had been amply demonstrated in rice [1]. Pal and Basu [4] attributed the beneficial effect of the chlorination to the stabilization of the unsaturated fatty acid moiety of lipoprotein membrane. The halogen stabilizes the C=C double bond in poly unsaturated fatty acids which are the primary sites of free radical attack [5].

The other treatment viz., thiram + carbaryl also proved superior to control. Srimathi *et al.* [6] reported that seed treatment with decis + thiram maintained maximum germination in paddy and pearl millet. Thiram due to its vapourising action proved more effective when combined with insecticides. The insecticide and fungicide combination protected the seeds from storage fungi and insects.

The type of container also influenced seed germination. The superiority of polylined gunny bag over cloth bag was evident at all intervals of storage. Seeds stored in cloth bag lost their germination earlier than those stored in polylined gunny bag due to absorption of moisture [7].

A progressive decline in seed germination was evident with increased storage period irrespective of seed treatments and storage containers. The untreated seeds stored in cloth bag declined rapidly than treated seeds in polylined gunny bag. Among

the varieties, CO 43 seeds performed better in storage.

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