

Storability of scarified and nonscarified seeds of tamarind (*Tamarindus indica* L.)

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Abstract: Studies were made to evaluate the storage potentiality of acid scarified and non-scarified seeds of tamarind in different packaging materials viz. cloth and 700 gauge polyethylene bags for a period of 12 months under ambient condition. The results revealed that scarified seeds could be stored upto 9 months (31 % germination) in cloth bag and 12 months in 700 gauge polyethylene bag (21% germination). But non-scarified seeds maintained 64 per cent and 49 per cent germination respectively in 700 gauge polyethylene bag and cloth bag after the storage period of 12 months. (*Key words:* Tamarind, Seed scarification, Storage)

Tamarind is a spice tree of India and its sour pulp is increasingly used for culinary preparations. Seeds are also used in tanning industry. Presence of hard seed coat reduces the germination. Seed treatment for alleviation of hard seeds and germination improvement for seedling / rootstock production will be useful. Hence studies were initiated to evaluate, the storability of scarified and unscarified seeds of tamarind under ambient condition using different packaging materials for prolonged storage.

Materials and Methods

Bulk seeds of local variety were collected from Coimbatore (11°02'N, 76°57'E). Seeds were scarified with commercial sulphuric acid @ 200 ml kg⁻¹ of seeds for 15 min. and washed with adequate water and dried under shade to bring the original moisture content (8-9%). Both scarified and unscarified seeds were packed in cloth and 700 gauge polyethylene bags and under ambient conditions at Coimbatore (mean RH \pm 70% temperature \pm 28°C). The experiment was conducted at Tamil Nadu Agricultural University, Coimbatore, during 1998. At trimontly intervals seeds were drawn and analysed for moisture content and germination (ISTA 1999). Ten normal seedlings were measured for the seedling length and vigour index values were computed as per Abdul Baki and Anderson (1973). Presence of insects was identified and percentage infestation was calculated. The data were statistically analysed as per Panse and Sukhatme (1995).

Results and Discussion

The scarified and nonscarified seeds stored under ambient conditions at Coimbatore indicated

that storage in cloth and polyethylene bags could maintain the vigour and viability upto 9 and 12 months respectively (31 and 21% germination). Tropical tree species maintained viability for a longer period of storage (Harrington, 1970; Sasaki, 1980). Among containers, seeds stored in 700 gauge polyethylene bags were better than the cloth bags due to the impermeability to atmospheric alterations of moisture (Harrington, 1973; Tompsett 1986). The increase in seed moisture with time of storage from 8.6 to 11.2 per cent in cloth bag irrespective of scarification treatment at 12 months of storage accompanied with a concomitant decrease in germination (Table 1). This might be due to the frequent atmospheric changes as reported by Justice and Bass (1978) and ageing process (Woodstock and Combs, 1967). But the lower rate of moisture absorption in non-scarified seeds may be the reason for maintenance of germination and vigour during storage. Natarajan (1982) in *Leucaena leucocephala*, Masilamani (1992) in *Prosopis juliflora* and *Cassia siamea* indicated that non-scarified seeds were better storers due to non-susceptibility to atmospheric weathering. The present study conformed that the non-scarified seeds of tamarind could be stored upto 12 months under ambient storage, while it was 9 months for scarified seeds in cloth bag. The storability was still better in 700 gauge polyethylene bag.

The storability of tamarind seed was affected due to various storage pests viz. *Caryedon serratus*, *Sitophilus linearis*, *Ephestia cautella*, *Corceyra cephalonica*, *Lasioderma semicarne*, *Rhizopertha dominica*, *Aphomia gularis* and *Alphitobius laevigatus* (Jacob 1995). In the present study

Table 1. Influence of storage container on moisture content (%) and germination (%) of scarified and non-scarified seeds of tamarind

Con- tainer (C)	Treat- ment (T)	Moisture content (%)												Germination (%)											
		Period of storage in months (P)																							
		P ₀	P ₃	P ₆	P ₉	P ₁₂	Mean	P ₀	P ₃	P ₆	P ₉	P ₁₂	Mean	P ₀	P ₃	P ₆	P ₉	P ₁₂	Mean						
CB	NSS	8.4 (16.84)	8.8 (17.26)	9.4 (17.85)	10.0 (18.43)	10.5 (18.91)	9.4 (17.85)	80 (65.66)	75 (60.00)	71 (57.72)	57 (49.03)	49 (44.43)	66 (54.33)	80 (65.66)	75 (60.00)	71 (57.72)	57 (49.03)	49 (44.43)	66 (54.33)						
	SS	8.8 (17.26)	9.7 (18.15)	10.8 (19.19)	11.3 (19.64)	11.9 (20.18)	10.5 (18.91)	79 (62.73)	67 (54.94)	57 (49.03)	3.1 (33.83)	0 (43.28)	47 (43.28)	79 (62.73)	67 (54.94)	57 (49.03)	3.1 (33.83)	0 (43.28)	47 (43.28)						
	Mean	8.6 (17.05)	9.3 (18.00)	10.1 (18.53)	10.7 (19.09)	11.2 (19.55)	10.0 (18.43)	80 (63.43)	71 (57.72)	64 (53.13)	44 (41.55)	25 (30.00)	57 (48.81)	80 (63.43)	71 (57.72)	64 (53.13)	44 (41.55)	25 (30.00)	57 (48.81)						
PB	NSS	8.7 (17.15)	9.1 (17.55)	9.2 (17.66)	9.7 (18.15)	10.0 (8.43)	9.3 (17.76)	83 (68.03)	79 (67.23)	77 (62.73)	70 (56.78)	64 (53.13)	75 (60.00)	83 (68.03)	79 (67.23)	77 (62.73)	70 (56.78)	64 (53.13)	75 (60.00)						
	SS	8.8 (17.26)	9.1 (17.55)	9.4 (17.85)	10.1 (19.100)	10.6 (18.05)	9.6 (18.05)	80 (63.43)	70 (57.72)	68 (49.03)	57 (42.71)	2.1 (27.27)	57 (49.02)	80 (63.43)	70 (57.72)	68 (49.03)	57 (42.71)	2.1 (27.27)	57 (49.02)						
	Mean	8.8 (17.26)	9.1 (17.55)	9.3 (17.76)	9.9 (18.34)	10.3 (18.72)	9.5 (17.95)	82 (64.90)	75 (60.00)	73 (58.69)	64 (53.13)	43 (40.98)	66 (54.51)	82 (64.90)	75 (60.00)	73 (58.69)	64 (53.13)	43 (40.98)	66 (54.51)						
TxP	NSS	8.5 (16.95)	9.0 (17.46)	9.3 (17.76)	9.9 (18.34)	10.3 (18.72)	9.4 (18.85)	82 (66.82)	77 (63.62)	74 (60.28)	64 (52.91)	57 (48.78)	71 (58.48)	82 (66.82)	77 (63.62)	74 (60.28)	64 (52.91)	57 (48.78)	71 (58.48)						
	SS	8.8 (17.23)	9.4 (17.85)	10.1 (18.53)	10.7 (19.09)	11.3 (11.64)	10.1 (18.53)	80 (63.08)	69 (56.33)	63 (49.03)	44 (38.27)	11 (13.64)	53 (44.07)	80 (63.08)	69 (56.33)	63 (49.03)	44 (38.27)	11 (13.64)	53 (44.07)						
	Mean	8.7 (17.15)	9.2 (17.66)	9.7 (18.15)	10.3 (18.72)	10.8 (19.19)	9.7 (18.72)	81 (64.16)	73 (58.69)	68 (55.55)	54 (47.29)	34 (35.67)	66 (54.51)	81 (64.16)	73 (58.69)	68 (55.55)	54 (47.29)	34 (35.67)	66 (54.51)						
CD (P=0.05)		C (0.12)	T (0.12)	P (0.05)	CxT (0.18)	CxP (0.25)	TxP (0.12)	C (0.99)	T (0.99)	P (0.86)	CxT (1.40)	CxP (1.98)	TxP (1.98)	C (0.99)	T (0.99)	P (0.86)	CxT (1.40)	CxP (1.98)	TxP (1.98)						

(Figures in the parenthesis are arc sine values)

CB - Cloth bag; PB - 700 gauge polyethylene bag; NSS - Non scarified seeds, SS - Scarified seeds

Table 2. Influence of storage container on vigour index and insect infestation (%) of scarified and non-scarified seeds of tamarind

Con- tainer (C)	Treat- ment (T)	Vigour Index						Insect infestation (%)						
		Period of storage in months (P)						Insect infestation (%)						
		P ₀	P ₃	P ₆	P ₉	P ₁₂	Mean	P ₀	P ₃	P ₆	P ₉	P ₁₂	Mean	
CB	NSS	4001	3723	3273	2537	2107	2607	0	0	0	0	32	46	16
												(34.45)	(42.71)	(23.58)
	SS	4485	3533	2582	1364	0	1994	0	14	39	68	100	100	44
									(21.97)	(38.45)	(55.55)	(90.00)	(90.00)	(41.55)
	Mean	4243	3628	2928	2451	1054	2301	0	7	20	50	73	73	30
									(15.34)	(26.57)	(45.00)	(58.69)	(58.69)	(33.21)
PB	NSS	4242	3966	3653	3157	2816	2972	0	0	6	22	36	36	13
										(14.18)	(27.97)	(36.87)	(36.87)	(21.13)
	SS	4433	3720	3243	2569	876	2474	0	6	3	36	72	72	27
									(14.18)	(9.97)	(36.87)	(58.01)	(58.01)	(31.31)
	Mean	4338	3843	3448	2863	1846	2723	0	3	5	29	54	54	20
									(9.97)	(12.92)	(32.58)	(47.29)	(47.29)	(26.57)
Mean	NSS	4122	3845	3463	2847	2462	2790	0		27	41	15	15	15
									(9.97)	(31.31)	(39.82)	(22.79)	(22.79)	(22.79)
	SS	4459	3627	2913	1967	438	2234	0	29	52	86	36	36	34
									(32.58)	(46.15)	(68.03)	(36.87)	(36.87)	(35.67)
	Mean	4290	3736	3188	2657	1450	0	5	17	40	64	64	64	64
		C	T	P	CXT	CXP	TXP	T	P	CXT	CNP	TXP	TXP	NS
	CD (P=0.05)	60.74	60.74	85.90	85.90	121.5	121.5	(20.60)	NS	(2.32)	NS	(98.61)	(98.61)	NS

(Figures in the parenthesis are arc sine values)

CB - Cloth bag; PB - 700 gauge polyethylene bag; NSS - Non scarified seeds; SS - Scarified seeds

the storage insects viz. *Caryedon serratus*, *Sitophilus linearis* and *Tribolium castaneum* were observed during storage and the insect infestation was lower in nonscarified seeds (15%) than in scarified seeds (35%) at the end of the storage period of containers. In cloth bag the insect infestation was 100% at 12 months of storage in scarified seeds. The lesser percentage of infestation (20%) in 700 gauge polyethylene bag might be due to the ability to check secondary multiplication of insects during storage (Table 2) compared to cloth bag (30%).

The study clearly indicated that for maintenance of germination and vigour and to reduce the insect infestation in storage the non-scarified tamarind seeds could be stored in 700 gauge polyethylene bags.

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(Received: December 2000; Revised: October 2001)