



Storability of safflower seed as influenced by storage container

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Abstract

The effect of storage container on seed quality parameters of safflower C.V. Bhima were studied during 2014-15. It was observed that safflower seeds with 7% moisture content stored in polyethylene bags can retain more germinability to the next planting season under warm and moderately humid condition of Nagpur as compared to jute and cloth bags.

KEY WORDS : Safflower, Storage container, seed moisture, seedling length, seedling dry weight, field emergence.

INTRODUCTION

Facilities for seed storage in India are not only inadequate but also improper. Relative humidity greatly influences longevity of seed in storage, because moisture content is directly related to the humidity of the atmosphere (Debouche et al. 1973). Temperature also affects seed quality during storage. Arulnandhy and Senanyake (1988) and Shivankar et al. (1990) reported superiority of container that is moisture vapourproof compared with that moisture pervious to. Hence an experiment was conducted to evaluate the effectiveness of different types of containers for safe storage of seeds of safflower (*Carthamus tinctorius* L.)

MATERIAL AND METHODS

Seeds of 'Bhima' safflower harvested on 20 April 2014 were used. The seeds were cleaned and dried at 40°C in hot-air oven to moisture content of 7%. These were packed in 3 types of containers, viz jute bag (moisture pervious, cloth bag (moisture pervious) and polyethylene bag of 700 gauge (moisture vapour proof) of size 20 cm x 30 cm respectively.

The fresh jute and cloth bags containing the seeds were closed by stitching and the polyethylene bags were sealed by heating to the mouth and stored in wire-mesh almirah in a masonry building having cemented walls, roof and floor under ambient temperature (10.6 – 43.4°C) and relative humidity (35.8- 87.3%) for 18 months. Observations were recorded on seed- moisture content, germination, seedling length, dry weight of seedlings and field emergence at 3-month interval. The moisture content of the seed was determined by the air-oven method (ISTA, Zurich 1985). The Length and dry weight of seedling was determined at 14 days of germination on 10 random normal seedlings. Four replicates of 100 seeds were used for germination and field emergence. The germination (%) and field

emergence (%) was evaluated for normal seedlings (ISTA, Zurich 1985).

RESULTS AND DISCUSSION

Seeds were stored initially at 7% moisture. After 18 months of storage their moisture content in sealed polyethylene bags was less than that in jute and cloth bags, at all the periods of storage (Table1). The seed stored in polyethylene bags showed high viability due to minimized moisture fluctuation of seed under storage. But those stored in jute and cloth bags, showed low viability, because these materials provided little protection against moisture fluctuation in the seeds. These results corroborate the findings of Arulnandhy et al. (1984) and Arunlandhy and Senanayake (1988). Varier and Agrawal (1989) reported that seed- moisture content is one of the most important factors affecting viability of seed during storage.

The germination of stored seeds declined with increase in the period of storage. However, the rate of loss in germination varied with the type of container used. The germination percentage recorded in the jute, cloth and polyethylene bags was initially 98.2% in June 2014, it became respectively 94.6, 97.1 and 97.9% in May 1990, 50.0, 59.5 and 81% in November 1990. The decline in germination from initial periods of storage up to 18 months was 48, 38 and 17% when the seed was stored respectively in jute, cloth and polyethylene bags. At all periods of storage the seed stored in polyethylene bag showed significantly higher germination compared with that stored in cloth and jute bags. The storage period of seed (80%, as per certification standard) was 15, 9 and 6 months in polyethylene, cloth and jute bags. The result confirms the findings of Varier and Agrawal (1989), Charjan and Tarar (1991), Lambat et al. (2011) and Gadewar et al. (2016)

The seedlings stored in Polythylene bags showed more vigour than those in jute and cloth bags during all the period of storage, as indicated by higher length and dry weight of seedlings and their field emergence. The result confirms the findings of Vanangumudi (1988), Arulnandhy

and Senanayake (1988), Lambat et al. (2011) and Gadewar et al. (2016)

It was concluded that safflower seeds with 7% moisture content stored in polyethylene bags can retain viability to the next planting season even under warm and moderately humid conditions of Nagpur.

Table No. 1: The Effect of Storage container on seed quality of safflower during storage.

Storage Period	Seed moisture (%)			Seedling length			Dry weight of seedlings (g)			Field emergence (%)		
	JB	CB	PB	JB	CB	PB	JB	CB	PB	JB	CB	PB
June 2014 (0 month)	15.35 (7.00)	15.35 (7.00)	15.35 (7.00)	20.6	20.6	20.6	0.28	0.28	0.28	74.85 (93.20)	74.85 (93.20)	74.85 (93.20)
3 Aug 2014	17.07 (8.60)	16.63 (8.20)	16.17 (7.80)	20.5	20.4	20.7	0.28	0.28	0.28	75.73 (93.90)	72.81 (91.30)	76.07 (94.20)
6 Nov 2014	16.64 (8.20)	16.45 (8.00)	15.75 (7.40)	18.2	18.5	19.2	0.25	0.26	0.27	69.78 (88.10)	71.66 (90.10)	74.95 (93.30)
9 Feb 2015	16.32 (7.90)	16.08 (7.60)	15.45 (7.10)	16.44	16.7	18.7	0.20	0.21	0.26	58.87 (73.30)	66.27 (83.80)	73.05 (91.50)
12 May 2015	15.14 (6.80)	15.22 (6.90)	14.97 (6.70)	15.4	15.8	18.2	0.20	0.20	0.26	54.35 (66.00)	58.05 (72.00)	70.87 (89.30)
15 Aug 2015	16.74 (8.30)	16.48 (8.00)	15.21 (6.90)	13.1	13.5	18.3	0.16	0.16	0.26	49.02 (57.00)	51.35 (61.00)	64.17 (81.00)
18 Nov 2015	17.33 (8.90)	16.66 (8.20)	15.54 (7.20)	10.2	11.1	16.2	0.13	0.15	0.22	38.62 (39.00)	44.57 (49.30)	58.38 (72.50)
SEM+	0.22	0.15	0.50	0.57	0.55	0.48	0.01	0.01	0.01	1.07	0.89	0.97
CD (P=0.05)	0.65	0.46	1.50	1.70	1.64	1.44	0.05	0.05	0.05	3.18	2.65	2.90

JB, Jute bag, CB, cloth bag, PB, Polyethylene bag
Figures in parentheses are actual values.

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