INTERNATIONAL JOURNAL OF RESEARCHES IN BIOSCIENCES, AGRICULTURE AND TECHNOLOGY
© VISHWASHANTI MULTIPURPOSE SOCIETY (Global Peace Multipurpose Society) R. No. MH-659/13(N)
www.vmsindia.org

EFFECT OF STORAGE CONTAINERS ON MYCOFLORA AND GERMINABILITY OF TIL

A. Lambat[1], P. Lambat[2], R. Gadewar[3] and S. Charjan[4]
[1] Sevadal Mahila Mahavidyalaya and Research Academy, Nagpur, M.S. India
[2] Shri Mathuradas Mohota College of Science, Nagpur (M.S), India
[3] Dr. P D K V 'S College of Agriculture, Nagpur (M.S), India
rajeshgadewar29@gmail.com

Abstract:
Til (*Sesamum indicum* L.) seeds after 6, 12 and 18 months were tested for total fungi incidence and germination percentage. A direct correlation was obtained between total mycoflora and germinability. With advance of storage period, the field fungi showed a decline and storage fungi increased rapidly in their percentage of incidence. Storage of Til seeds should be made in polyethylene bag in preference to other containers to preserve greater germinability and lesser seed invasion by the fungal flora during storage. Thiram (0.3%) showed overall superiority to other fungicides.
Keywords: Germination percentage, Mycoflora, Germinability, Percentage of incidence, Storage

Introduction:

In any seed production programme, storage of seeds from harvest to next planting season / seasons is of prime importance to preserve their viability and vigour in the available storage conditions of a particular place. The ideal storage environment is rarely available throughout the year in nature (Bal, 1975). Artificial storage conditions are available at few places for very small quantity of precious seeds. Further, during various processes from maturity of crop to harvesting, threshing, processing and storage, the seeds get infested with a variety of field and storage fungi in addition to a number of seed-borne pathogens (Noble and Richardson, 1968; Mathur and Kabeere, 1975; Shukla and Bhargava, 1976; Kushi and Khare, 1976). The fungi remain active on the stored seeds, leading to deterioration in seed, qualitatively and quantitatively (Vijaya Kumari and Karan, 1981). Work was therefore, undertaken to study the associated mycoflora of Til seeds stored in different containers and their possible effect on seed germination.

Materials and Methods:

Til (CV. AKT-64) seeds were used in the various phases of this study, produced in 1988 (Kharif). Seeds were cleaned, dried and the moisture content was equilibrated to 5% packed in the following three containers:

Jute bag (moisture pervious) of the size 20 cm x 30 cm.

Cloth bag (moisture pervious) of the size 20 x 30 cm.

Polyethylene bag 700 gauge (moisture proof) 20 x 30 cm.

The fresh jute, cloth and polyethylene bags containing seeds were closed by stitching and heat sealing and were stored in wire mesh almirah in masonry building having cemented walls, roof and floor under ambient temperature (10.6 to 43.4°c) and relative humidity (35.8 to 87.3%) for a period of 18 months. The observation of germination (untreated and treated with four fungicides viz., Carbendazim, Captan, Captatol and Thiram (0.3%) and fungal flora were recorded at trimonthly interval. The germination percentage was recorded according to International Rules for Seed Testing (Anon, 1985). Four hundred seeds were used to isolate fungi following standard blotter and agar plate methods (Anon 1976).

Results and Discussion:

As shown in Table 1, maximum incidence of fungi in jute and cloth bags was observed while polyethylene bag provided much protection to Til seeds in preventing the development of fungal colonies both quantitative and specieswise. The findings are in agreement with the results obtained by Dwivedi and Shukla (1990).

Aspergillus flavus, Aspergillus niger, Fusarium monaliforme, Macrophomina phaseolina, Penicillium oxalicum and *Rihzopus nigricans* are the most commonly occurring fungi irrespective of period and container of storage. *Alternaria sesami, Chaetomium globoswn, Coryhespora cassicola, Curvularia clavata* and *Fusarium oxysporum,* on the other hand, occurred rarely. With the advance of storage period, the storage fungi increased rapidly in their percentage of incidence.

Christensen (1973), Srivastava and Gupta (1980) have reported increase in the percentage of storage fungi followed by loss in the field fungi under storage.

The reasons for unexpected fluctuation in the occurrence of a number of fungi at different intervals may largely be attributed towards the fluctuation in the atmospheric relative humidity and temperature during the period of storage which favour the growth and development of fungi. Requirement of relative humidity and temperature vary for the growth and development of different fungi. This might have resulted in appearance of a particular fungus at one instant and non-appearance at the other. It was further evident that increase in the number of infected seed was on account of increase in the number of mycoflora. It appears that storage of Til seed be made in polyethylene bag in preference to other containers to preserve greater seed germinability and lesser seed invasion by the fungal flora during storage.

In general, there was a sizable decrease in germinability with the increase in period of storage in seeds from every container. Sharma and Sharma (1978) concluded that the poor storage conditions play a dominant role in proliferation and development of fungi in stored seeds and due to their activities the seed germination is also markedly affected.

The minimum deterioration of seed viability (the highest seed germinability) was recorded in the seed from polyethylene bag as compared to jute and cloth bags. The results obtained are in conformity with the findings of Arulnandhy and Senanayake (1988).

TABLE-1

Germination percentage and mycolfora incidence at various period and types of storage container percent fungi encountered on seeds of Til

Fungi	6 months storage			12 months storage			18 months storage			Initial
	JB	CB	PB	JB	CB	PB	JB	CB	PB	1.75
Alternaria sesami	1.50	1.50	1.00	1.00	-	-	-	-	-	-
Aspergillus flavus	8.25	9.00	3.75	21.75	23.25	11.75	36.00	34.75	20.00	0.50
Aspergtllus niger	8.00	8.50	4.00	25.00	21.75	13.00	42.75	46.25	29.75	0.50
Chactomium glohosum	5.75	5.75	6.25	2.75	3.50	3.00	-	-	-	0.50
Corynespara cassida	3.00	3.75	3.25	-	-	-	-	-	-	0.75
Curvularia clarata	5.75	6.00	4.25	9.75	11.25	3.75	-	-	-	4.00
Fusarium oxysporum	5.00	2.75	0.75	2.75	1.25	-	-	-	-	1.00
Fusarium monaliforme	4.00	2.00	1.25	8.75	8.75	4.25	12.75	10.00	9.00	-
Macrophomina phaseolina	9.00	8.25	8.00	14.00	11.00	7.75	6.25	4.25	5.25	8.25
Penicillium oxalicum	2.00	1.00	1.00	9.25	7.25	4.00	17.25	15.00	11.25	-
Rhizopus nigricans	1.00	-	-	11.75	13.25	6.25	29.00	25.25	13.25	-
Total organisms	2	10	10	10	9	8	6	6	6	7
Total incidence (%)	53.25	48.50	33.50	106.75	101.25	53.75	144.00	135.50	88.50	21.00
Germination (%) untreated 93.0	95.0	94.0	72.0	78.0	90.0	38.0	54.0	71.0	92.0	
Carbendazim (0.3%)	97.0	99.0	98.0	87.0	90.0	96.0	54.0	69.0	87.0	98.0
Captan (0.3%)	94.0	95.0	95.0	78.0	83.0	93.0	45.0	60.0	79.0	93.0
Thiram (0.3%)	99.0	99.0	100.0	91.0	92.0	97.0	56.0	73.0	90.0	100.0

JB – jute bag, CB – cloth bag, PB – polyethylene bag.

Conclusion:

Under laboratory conditions, germination was tested after treatment with fungicides viz., Carbendazim, Captan, Captafol and Thiram (0.3%). These were found to be effective over untreated seeds. Thiram (0.3%) proved superior showing the highest per cent germination followed by Carbendazim, Captan and Captafol, (Table-1). Patil (1980) reported effectiveness of thiram and bavistin when applied as dry seed dresser and gave best control of *Aspergillus flavus, Aspergillus niger* and *Rhizopus* sp. Charjan and Tarar (1991) reported improvement in the germination of soybean seed treated with Carbendazim, Captan, Captafol and thiram.

References:

Anonymous, 1976. International rules for seed testing. Seed Sci. And Technol., 4: 108.

Anonymous, 1985. International rules for seed testing. Seed Sci. And Technol., 13: 299-513.

Arulnandhy, V. And Senanayake, Y.D.A. 1988. Deterioration of soybean seed stored in different containers under ambient conditions. Seed Res., 16(2): 183-192.

Bal, S.S. 1975. Magnitude and type of seed storage needs in India. Seed Res., 4(1): 1-5.

Christensen, C.M. 1973. Loss of viability in storage microflora. Seed Sci. and Technol., 1:547-562.

Charjan, S.K.U. and Tarar, J.L. 1991. Effect of systemic insecticides and fungicides seed treatment on the germination and seedling development of soybean (*Glycine max* L.). Proc. 78th Ind. Sci. Cong. Indore, Abst. No.266.

Dwivedi, S .N. and Shukla, T.N. 1990. Effect of methods of storage on germinabilily and mycoflora of gram (*Cicer arietinum* L.) seed. Seed Res., 18 (1): 82-85.

Kushi, K.K. and Kharc, M.N. 1979. Scedborne fungi of sesame and their significance. Seed Res., 7 (1): 48-53.

Mathur, S.B. and Kabeere, F. 1975. Seed-borne fungi of sesame in Uganda. Seed Sci. and Technol., 3:655-660.

Noble, M. and Richardson, M.J. 1968. Transmission of Charcol rot by sesame seed. Phytopath. Medi., 2:90-92.

Patil, B.C. 1980. Chemical control of seed-borne fungi of groundnut. Seeds and Farms,. 6 (6, 7): 55-56.

Shukla, D.N. and Bhargava, S.N. 1976. Fungi isolated from Seeds of oil crops. Proc. Nat. Aca. of Sci. Ind., 46.: 442-444.

Sharma, J.P. and Sharma, K.D. 1978. Studies on moisture content, mycoflora and germination of lentil *(Lens esculenta* Mocnch.) seeds. Seed Res., 6(1): 31-37.

Srivastava, R.N. and Gupta, J.S. 1980. Effect of storage on the mycoflora and viability of pansy and verbena seeds. Seeds and Farms, 6 (4): 25-28.

Vijaya Kurnari, P. and Karan, D. 1981. Deterioration of cowpea seeds in storage by *Aspergillus flavus.* Ind. phytopaih., 34 (2): 222-223.