GAU Res. J. 2000. 25 (2) : 79-83

Short Communications

Physico-Biochemical Composition of Wheat During Storage on Seed Treatment

B. M. Patel, B.A. Patel and P. D. Vekariya

Chimanbhai Patel College of Agriculture, Gujarat Agricultural University, Sardar Krushinagar 385 506

Quality seed is a basic input to boost the crop yield. The demand for seed is fluctuating and very often there are large surplus stocks of seed which needs to be stored for 1-2 years. Such left over seeds pass through the hot and humid monsoon period which may affect the physico-biochemical properties and quality of seed. Cereal seeds loose their viability in a short period if stored under ambient storage conditions. Leaching of sugar and electrical conductivity increase during storage (Shelar and Bapat, 1991). Due to scarcity of ideal storage godowns in Indian conditions, emphasis on alternatives such as seed treatment become more suitable and economic substitute. However, information on change in wheat seeds stored under ambient conditions especially, in relation to seed treatments in scarce. Hance, this investigation was carried out.

Seeds of four wheat varieties viz., Sonalika (V_1), Lok-1 (V_2), Kalyan Sona (V_3) and GW 496 (V_4) sun dried to adjust the moisture to 10 per cent were divided into the units of 5 kg each and treated with Carbendazim (50%) and Thiram (75% WDP) each @ 2 g/kg seed, Methyl Parathion (2% dust) and Castor oil each @ 10 g/kg seed alongwith a control (without seed treatment). Seed samples were stored from May, 1992 in polythene bags of 400 gauge in the Seed Technology Laboratory under ambient conditions of Sardar Krushinagar, in completely randomized design with four replications for a period of twelve months. Seeds were tested for electrical conductivity of the leachate, germination per cent and vigour index at monthly intervals as described below.

Electrical conductivity

5g seeds from each treatments were taken in a beaker and surface sterilized with 0.1 % mercuric chloride solution for 5 minutes. After washing it thoroughly with tap water and then with distilled water, 25 ml distilled water was added to it and kept for 18 hours. Again, 25 ml distilled water was added and the leachate was filtered. EC (micromhos / cm at 25°C) of the leachate was measured on EC meter (Bradnock and Matthews, 1970).

TABLE 1.

Physico-biochemical composition of wheat as influenced by varieties and seed treatments during storage.

Treatments	*EC (micromhos / cm)*	*Germination (%)*		*Vigour index*
STORAGE PERIOD (S)				
(in months)				
1	252.5	79.80	(96.59)	2051
2	246.3	79.32	(96.24)	2103
3	248.1	79.09	(96.06)	2162
4	249.5	78.35	(95.75)	2207
5	253.3	76.71	(94.53)	2252
6	257.1	75.62	(93.66)	2253
7	261.8	73.65	(91.91)	2175
8	264.5	72.46	(90.82)	2076
9	268.1	71.11	(89.47)	1965
10	273.8	68.93	(87.02)	1815
11	277.5	67.63	(85.47)	1729
12	279.0	67.32	(85.11)	1644
S.Em. +	0.88	0.18		5.74
C. D. (P=0.05)	2.43	0.49		15.92
VARIETIES (V)				
Sonalika	286.8	72.75	(98.69)	2040
Lok-1	276.2	73.39	(91.24)	1983
Kalyan Sona	246.0	74.61	(92.36)	1920
GW 496	231.8	75.92	(93.96)	2202
S.Em. +	0.51	0.18		3.32
C. D. (P=0.05)	1.40	0.49		9.19
SEED TREATMENT (T)				
Carbendazim	239.8	74.88	(92.59)	2168
Thiram	236.8	76.70	(93.86)	2233
Methyl Parathion	266.3	73.90	(91.70)	1986
Castor oil	289.1	71.34	(89.38)	1812
Control	269.8	74.01	(91.83)	1982
S.Em. +	0.57	0.24		5.52
C. D. (P=0.05)	1.57	0.69		15.76
INTERACTION (V X T)				
S.Em. +	1.13	0.23		8.92
C. D. (P=0.05)	3.16	0.64		24.73

N. B. : Figures in the parentheses are untransformed values.

TABLE 2

Interaction effect of varieties and seed treatments on EC, germination (%) and vigour index during storage.

Varieties	*Seed treatments*				
	T_1	T_2	T_3	T_4	T_5
Electrical conductivity					
V_1	268.3	264.9	289.6	318.8	293.1
V_2	258.8	257.7	279.2	302.7	282.5
V_3	222.7	220.6	254.6	273.3	258.5
V_4	209.4	201.5	241.7	261.7	245.0
C.D.(P=0.05) : 3.16					
Germination (%)					
V_1	73.72	75.29	73.25	68.06	73.45
	(92.00)	(93.00)	(91.00)	(86.00)	(91.00)
V_2	74.19	75.70	72.82	71.10	73.12
	(92.00)	(93.00)	(91.00)	(89.00)	(91.00)
V_3	75.31	76.87	74.46	72.46	74.29
	(93.00)	(94.00)	(92.00)	(91.00)	(92.00)
V_4	76.32	78.93	75.43	73.75	75.17
	(94.00)	(96.00)	(93.00)	(92.00)	(93.00)
C.D.(P=0.05) : 0.64					
Vigour Index					
V_1	2118	2155	2035	1856	2035
V_2	2054	2129	1946	1846	1947
V_3	2032	2093	1928	1627	1919
V_4	2470	2563	2033	1917	2026
C. D. (P=0.05) : 24.73					

N.B. : Figures in the parentheses are untransformed values.

Germination (%)

100 seeds from each treatment were germinated at 30 + 1° C for 7 days in seed germinator using rolled paper towel method (Anon., 1985). The seedlings were categorised as normal and abnormal. Germination (%) was expressed on the basis of normal seedlings only employing Arc Sin transformation.

Vigour index

Vigour index was determined by multypling the germination (%) with the sum of root and shoot length of seedling in cm (Woodstock, 1969).

Electrical conductivity, germination and vigour differed significantly during storage (Table -1) EC of the seed leachate was the lowest in the beginning of the experiment and increased with storage. As the seed moisture increase, the cell memberane become less rigid and more water permeable allowing the cell contents to escape into the solution, increasing its EC (Copeland, 1976). Increase in EC with storage in sorghum have been observed by Aswathaiah and Murthy (1986). In contrary to EC, germination decreased significantly and progressively during the storage. This may be explained by the increased seed respiration due to increased temperature and relative humidity. Decrease in seed germination with storage have been reported by Singh and Borikar (1985). Vigour index increased with storage upto six months and thereafter, it decreased upon further storage. Vigour index being a dependent character on root and shoot lengths of seedling, followed the pattern of change in these characters. Singh and Borikar (1985) reported that vigour index of sorghum was good upto four months and then there was a gradual reduction upon further storage. However, Mehta and Patel (1990) reported decrease in vigour with storage.

Significant differences in EC, germination and vigour due to varieties indicated genotypic variation for these characters. Variety GW 496 recorded the lowest EC and highest germination as well as vigour indicating its superiority over other varieties for these characters. Genotypic variation for each traits have been reported by Singh (1986) and Singh (1987).

Effect of seed treatments was significant. Seed treatment with Thiram helped to record the lowest EC and higher germination percentage and vigour. This might be attributed to the longer persistance of Thiram on seed (Vyas and Nene, 1975). Beneficial effect of Thiram in maintaining seed viability of pearlmillet have been reported by Dakshinamoorthy and Sivaparkasam (1988).

The interaction effect (Table - 2) revealed that variety x seed treatment interaction was significant for EC, germination (%) and vigour index. Seeds of GW 496 when treated with Thiram recorded significantly higher seed germination and vigour index. The viability of GW 496 was better enough and in presence of Thiram it was enhanced. This combination recorded significantly lower EC suggesting antagonistic relationship of EC with seed viability.

(Received on 24th Janu., 1995)

REFERENCES

Anonymous (1985). International rules for seed testing. *Seed Sci. & Technol.*, **13** : 299-513.

Aswathaiah, B. and S. Murthy (1986). Study on sorghum seed quality in storage. *Seeds & Farms*, **5** : 9-14.

Bradnock, W.T. and S. Matthews (1970). Assessing field emergence potential of wrinkled peas. *Horticultural Research*, **10** : 50-58.

Copeland, L. O. (1976). Principles of Seed Science and Technology, Burgess Publishing Company, Minneapolis, Minnesola.

Dakshinamoorthy, T. and K. Sivaoprakasam (1988). Effect of seed treatment with fungicides and insecticides on the viability of pearlmillet seeds during storage. *Madras Agric. J.*, **75** (9 & 10) : 339 - 343.

Mehta, B. V. and B.V. Patel (1990). Effect of storage periods and temperature on micronutrient content and germination in sorghum. *Adv. in Pl. Sci.*, **3** (2) : 228-235.

Shelar, V. R. and D. R. Bapat (1991). Effect of storage conditions on viability and vigour in sorghum. *Annals of Pl. Physiol.*, **5** (2) : 176-182.

Singh, A. K. (1986). Effect of genotype and container on storability of wheat seed. *Bulletin of Grain Tech.*, **24** (3) : 229-231.

Singh, A. R. (1987). Physico-biochemical composition of sorghum as influenced by seed size during storage. *J. Maharashtra agric. Univ.*, **12** (3) : 294-297.

Singh, A. R. and S. T. Borikar (1985). Seed quality and storability as influenced by time of harvesting in sorghum. *J. Maharashtra agric. Univ.*, **10** (2) : 167-169.

Vyas, S. C. and Y. L. Nene (1975). Influence of moisture on the persistence of thiram on sorghum during storage. *JNKVV Res. J.*, **9** (1 & 2) : 50-54.

Woodstock, L. W. (1969). Seedling growth as a measure of seed vigour. *Proc. Int. Seed Test. Assoc.*, **34** : 273-280.