



Effect of Seed Colouring on the storability in Maize.

Rajesh Gadewar¹, Shanti Patil², Sanjiv Charjan³, Ashish Lambat⁴

^{1, 4} Sevadal Mahila Mahavidyalay and Research Academy, Nagpur.

^{2 3} : PDKV's College of Agriculture , Nagpur.

ABSTRACT

Storage studies in Maize seeds treated with four dyes viz, Amaranthus red, Sunset yellow, Methylene blue and Potassium permanganate each at 5 and 10 percent concentration and treated with or without fungicide indicated that germination was maintained satisfactorily for 10 months above 90 percent in all these dyes at 5 or 10 percent treated with fungicide compared to control. These treatments also recorded higher vigour index, less electrical conductivity and the insect infestation throughout the storage period. However, among dyes, Potassium permanganate 10 per cent concentration showed slightly deleterious effect on seed quality.

Key words : Maize, Storage, colouring, seeds, dyes.

INTRODUCTION:

Seed colouring with dyes has become a common practice with private seed companies as it enhances their company image, identity and seed trade. Colouring of seeds improves the overall appearance of seeds and increases consumer preferences. It also acts as insect and bird repellent. In storage, seed lots of different years could be easily identified and adulteration of seeds can be checked. Very few studies on the effect of seed colouring on seed quality in storage are available at present. Ryker (1) Basavaraj and Kurdikeri (2), Prasad et.al (3). Reported the beneficial effects of dyes on seed storability while, differential influence of dyes on seed viability in storage was reported by Tonai (4), Shivanna (5) and Basavaraj (6) Hence, a study was conducted to ascertain the storage potential of coloured seeds in maize.

MATERIALS AND METHODS

Freshly harvested seeds of Maize Variety PKVM- Shatak were soaked in four dyes viz., Amaranthus red, Sunset yellow, Methylene blue and Potassium permanganate at 0.5 or 1.0 per cent concentration for 15 minutes and dried to original weight. A portion of dyed seed was treated with fungicide (Captan 2 g/ kg seeds). Treated and untreated seeds were kept in cloth bag at ambient temperature for 12 months at the Department of Agril. Botany, College of Agriculture Nagpur during 2013-14. Seeds were drawn bimonthly for recording observations on germination, vigour index (VI) and electrical conductivity (EC) by adopting the procedure as prescribed in ISTA Rules (7). Insect infestation during storage was also ascertained.

RESULTS AND DISCUSSION

The germination (Fig. 1,2) of maize seeds treated with dyes at 0.5 and 1.0 percent concentrations with or without fungicide decreased with the increase in storage period. Minimum germination percentage of 90

percent as per the minimum seed certification standards was maintained upto 10 months in all the treatments. However, irrespective of dyes concentrations fungicide treated seeds were found to maintain 90 per cent germination upto 12 months, the interaction effect due to dyes, concentrations showed differential response in germination behavior (Fig.1). at 12 months storage seeds treated with Amaranthus red, Sunset yellow, Mehtylene blue and Potassium permanganate at 5 and 10 percent concentration and with fungicide found to maintain viability above 90 percent compared to control and other treatments which had lesser germination. However, Amaranthus red at 5 per cent with fungicide helped to maintain viability (90%) upto 16 months. Similar differential response in germination with dyes were reported Prasad et al (3) in Mvanna(5) in sorghum and Basavaraj (6) in soybean.

Vigour index

The vigour index (Table 1) decreased with the increase in storage period in all the dye treated seeds at 5 and 10 per cent concentration and with or without fungicide treatments. However, VI was generally more in all the dyes at 5 percent concentration treated with fungicide compared to 10 percent and control. The results are in conformity with Prasad et al (3) , Shivanna (5) and Basavaraj (6).

Electrical conductivity

Electrical conductivity increased with the increased in all dye treatments at 5 and 10 percent irrespective of fungicide treatment (Table 1). However, it was less in all the storage months in seeds treated with any of the dyes at low concentration (5%) with fungicide treatment compared to higher concentration (10%) with no fungicide treatment. In general EC of Potassium permanganate treated seeds at 5 and 10 per cent concentration without fungicide was more

than other treatments. Similar increase in EC with Potassium permanganate was reported by Basavaraj (6) in soybean.

Insect Infestation.

The insect infestation study (Table 1) revealed that with the increase in storage period there was gradual increase in infestation in all the dyes both at 5 and 10 percent concentration irrespective of fungicide treatment. The infestation level was generally

less at higher concentration (10%) of any dye, and with fungicide treatment throughout storage period compared to control and 5 per cent concentration with no fungicide treatment.

The present study indicated that, maize seeds could be safely coloured with dyes either at 5 or 10 percent concentration followed by captan treatment without any harmful effect on seed quality during storage.

Table 1. Effect of seed colouring on vigour index and electrical conductivity in maize during storage

Treatment	Vigour index		EC (dSm-1) Storage months		Infestation (%)		Germination (%)	
	Initial (2)	12	Initial (2)	12	Initial (2)	12	Initial (2)	12
Dyes								
Amaranthus Red	2475	1419	0.32	0.41	0.00	7.5	99	87
Sunset yellow	2471	1391	0.32	0.42	0.00	10.9	99	86
Methylene blue	2466	1386	0.32	0.43	0.00	11.4	99	84
Potassium permanganate	2451	1362	0.32	0.49	0.00	8.65	99	83
Concentrations (%)								
Control	2434	1312	0.32	0.43	0.00	13.4	99	83
0.5%	2496	1464	0.32	0.44	0.00	10.2	99	87
1.0%	2490	1436	0.32	0.48	0.00	6.8	99	85
Fungicide								
Control	2498	1318	0.32	0.47	0.00	10.4	99	83
Captan	2484	1452	0.32	0.40	0.00	7.90	99	91

REFERENCES

1. RYKER, T.C. (1959). Seed colouration Proceedings of short course for seedsmen. Mississippi State Seed Technology Laboratory, Mississippi, U.S.A., pp. 123-127.
2. Basavaraj G. and M.B. Kurdikeri (2000). Effect of Seed Colouring on seed storability in Soybean. Seed Research, 28(1) : 39-41
3. Prasad M.Y., M.B. Kurdikeri and M. Shekharagouda (2001) Storage potential of coloured seed of maize seed.
4. TONAPI, V.A. (1989) . Longevity and storability of sorghum seeds in relation to stage of harvest and position of seed on earhead along with seed treatment and storage containers. Ph.D. Thesis, TNAU, Coimbatore.
5. SHIVANNA, (1991) Studies on seed colouring experiments in hybrid sorghum CSH-5 (*Sorghum bicolor* (L.) moench). M.Sc. (Ag) Thesis, U.A.S., Bangalore.
6. BASAVARAJ, G. (1997) Effect of seed colouring on field performance and seed storability on soybean(*Glycine max* (L.) Merrill). M.Sc. (Ag.) Thesis, U.A.S., Dharwad.
7. ISTA, (1996), International Rules for Seed Testing. Seed Sci. Tech., 24 (Supplement): 1-335+7.

